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MARKET AND ECONOMIC POWER DEPENDENCY:
A PANEL REGRESSION STUDY OF BLACK AFRICAN COUNTRIES

by

© HEATHER GILLESPIE

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

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submitted by ....Heather Gillespie

in partial fulfilment of the requirements for the degree of Master of Arts.

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Date ...April 28, 1980............

DEDICATION

To Michael and Avrum.

ABSTRACT

As an outgrowth of the world system/dependency theory perspective on national development, there have been a large number of cross-national empirical studies of the effects of market and economic power dependency on economic growth. This thesis reviews these studies in an attempt to formulate a preliminary model using this literature as a guide. Our strategy is as follows: First, we put the empirical literature into the theoretical context of its conceptual roots in the critiques of classical economics and modernization theory. Second, we discuss the differences in the research designs and measurements in the empirical studies. Third, the results are compared and where possible, conclusions are drawn about the ways in which dependency affects growth. Fourth, new analyses based on this review are presented.

Snyder and Kick's recent blockmodel analysis of the world system suggests that of the six blocks comprising the periphery in terms of trade flow, military intervention, diplomatic relations and conjoint treaty membership networks, the two most extreme positions are exclusively African (1979:1114). For this reason, we limit our analysis to twenty-eight African countries. On the basis of our analysis, we conclude: (1) The effect of private foreign investment inports from the ex-metropole and aid has been to decrease the relative rate of economic growth of African countries. The effect of private foreign investment is indicated by the cumulative long term negative effect of stocks of PFI. The negative effect of aid is short term. (2) Short term percentage change in foreign investment increases growth. (3) This relationship is conditional on the extent to which peripheral countries are differentiated in terms of their integration into the core. These results provide preliminary support for the world system/dependency model.

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CHAPTER ONE

THEORETICAL OVERVIEW

I. Introduction

This thesis is a survey of findings and a reanalysis of cross-national evidence of the effects of foreign investment, aid and trade on the economic growth of African countries. Our empirical concern with studies informed by the world-system/dependency perspective directs us towards the study of Africa for two reasons. First, as Robin Luckham suggests in his paper on the Ghanaian legal profession (1978), everything about contemporary Africa may be viewed as a manifestation of Africa's historical dependence on Europe and the corresponding structural conditioning of African society by the demands of a world-economy (1978:201). Second, Snyder and Kick's recent blockmodel analysis of the world system suggests that of the six blocks comprising the periphery in terms of trade flow, military intervention, diplomatic relations and conjoint treaty membership networks, the two most extreme positions are exclusively African (1979:1114).

From a theoretical standpoint, our research attempts to integrate the dependencia, dependency, and world-system literature into a general explanation of development and underdevelopment that links economic growth to international relations and the parameters of the capitalist world economy.

The theoretical studies reviewed in Chapter One reflect the conceptual development of the world-system perspective from the Marxist critique of conventional economics and modernization theory. The purpose of the chapter is to outline the major twentieth century contributions to the study of development and to relate these perspectives to the context of African history. At the end of the chapter we introduce the interrelationship of the theoretical discussions with the recent empirical work done in the area.

II. Literature Review

1. The Classical and Neo-Classical Position of Economics on Economic Development

From the perspective of the classical economist, the underdeveloped economy becomes developed by progressive stages of product diversification and structural differentiation on the one hand, and increasing sectoral integration on the other. The high degree of internal differentiation increases the adaptive capacity of the system to exogenous shocks by creating structural features such as a market designed for the rational flow of the factors of production to undustry (Hoselitz, 1962; Rostow, 1971). Sectoral integration facilitates the evening-out of intersectoral differences in level of development by allowing "spread" effects to occur. (Kerr et al., 1964; Kravis, 1975; Ranis and Fei, 1961; Yotopolous and Nugent, 1976:7) Attaining the developed end-state is largely a question of perfecting market mechanisms or of initiating changes that will lead to self-propelled takeoff. (Yotopolous and Nugent, 1976:16)

In summary, the economy is largely seen as a closed system from the standpoint of classical economics. Thus the developmental process is one of "transformation" (Flammang, 1979:54). It is largely an internally-initiated sequence of national-economic decisions that transforms an economy from the state of underdevelopment to the state of development. Certainly costs are involved in the process. These include the inconvenience of unemployment, economic inequality and the abstinence from consumption in the interest of net savings, however, the costs of development are de-emphasized in lieu of the benefits.

There is a consensus among the mainstream of economists that the developmental process involves structural change in both social and political elements as well as economic. (See Charles P. Kindleberger, 1965; Everett E. Hagen, 1975.) By building on to the assumptions of the classical economic model, the collective body of works known as "modernization theory" has incorporated social and political variables into an explanation of development that is basically a twentieth century adaptation of the tradition/modernity dichotomy formulated by Tönnis (1956), Durkheim (1961) and Spencer (1914). Although the modernization literature stems from the suggestion that the task of development is not exclusively economic, the key variable in defining modernity remains the economy (Levy, 1966). Economics is integrated with sociology and political science in an attempt to determine the economic consequences, at the national level, of the modernization of individuals.

2. Modernization Theory: The Socio-Political Variant of Classical Economics

According to the modernizationists, "... self-sustained growth and mature economic structure are both the most difficult achievement and the final test of successful development." (Portes, 1973b:255).

Following their role models in economics,[1] students of modernization account for development in terms of internal processes (Eisenstadt, 1966; Stanley, 1972; Smelser, 1963). Only the substantive focus of the independent variables is altered to include urbanization, literacy, social mobility, mass media communication, factory maturity and democratic government at the structural level (Portes, 1973b:249), and changes in attitudes, aspirations and values associated with the "mental-flexibility" that accompanies urban-industrial society (Portes, 1973b: 249; Inkeles and Smith, 1974) at the individual level.

Rostow (1968) suggests that the modernization perspective was formulated by Western intellectuals as a response to the post-colonial emancipation of the non-West (42). In a review of the history of modernization theory, Almond (1973) adds that the area drew its substantive knowledge from the familiar structural-functional framework of Western-historical experience, in order to generalize about an unfamiliar Third World from a universal model of societal change.

Paradoxically, the theory's formulation (Almond and Powell:1966; Almond and Coleman:1960; Apter:1965; Pye:1966) generally explains "post-colonial" emancipation ahistorically, in terms of universal systemic, symbolic and/or structural characteristics (Bendix:1968; Riggs:1964), while interpreting the "non-West" component with a "once-only, European-parochial, perpetual progress" model of development (Gellner, 1969:139).

---

1. But with the exceptions of the 'diffusionist' emphasis on the borrowing of modern traits (Bendix, 1964) and the 'transfer of technology' theorists (Moore and Feldman, 1960) who imply that domestic development can be enhanced by exogenous resource flows such as investment and aid.

The comparative-history and social process variants of this model may be understood as attempts to refine the initial argument, and the current trend of social psychological work in the area of political development is, in part, a response to the inadequacies of the modifications. Comparative-historians (Black:1966; Eisenstadt:1966; Lipset:1963; Rustow:1967; Huntington:1968) address the functional model's internal ambiguity by differentiating between patterns of modernization, phases within the patterns (Rostow's five stages of economic takeoff) and roles of internal groups in the reorganization of traditional political modes (Eisenstadt). The social-process people (Lerner:1958; Deutsch:1961; Cutright:1963; Hudson:1968) focus on the reorganization of traditional structures in an attempt to sort out the relationship between the reorganization or political-integration of the modernizing society (Lerner) and the political mobilization (Deutsch) or breaking down of traditional patterns of association.

Some problems with the modifications of the structural functional model stem from the underlying acceptance of the basic model's economic format and teleological limitations. One problematic assumption concerns rational choice. Often disguised as the 'cultural contact' theory or the 'exposure to the benefits of modernity' thesis, 'rational-man the economic maximizer' arguments explain modernization with a two-step process of conversion followed by change. The conversion, or change in traditional values translates into a personality type associated with McClelland's (1971:84) concept of 'n Achievement', or with the more standard economic role of entrepreneurship (Hoselitz, 1964; Rostow, 1971). Portes criticizes the conversion thesis for two reasons. First, he questions the assumption that the same social means and the same motors which led to Western change must be employed in the Third World. Second he is skeptical of the necessity of changing traditional institutions that need not be necessarily anti-economic (1973b:255).

More fundamental are the ambiguities associated with the underlying assumptions of rational choice. As Migdal suggests (1974:193), rational-choice conversion is without severe discontinuities; the more differing sectors interact, the more individuals will gain the attributes associated with modernity. First, this passive and inevitable process of integration may explain the occurrence of modernization. After traditional structures break down, however, Hagen's (1962) conclusion about the extreme stability of traditional society leads one to question how this stability was initially undermined. The colonial slave trade in East Africa and the wholesale seizure of West-coast land for export production come to mind, but this destruction of Africa's traditional economic and societal structure was anything but passive. Second, the relationship between exposure to modernity and economic progress is not empirically substantiated for the Third World. Moreover, it may not be possible to determine such a correlation given the enormous methodological jump one must take to connect value changes at the individual level to structural changes in institutions, to aggregate economic growth. We will discuss this problem further in the review of the empirical literature, however despite decades of cultural contact, foreign investment and technology transfer, the Third World has continued to display little change in its low economic position while the rich countries have continued to increase their wealth.

3. Marxist Economics: An Alternative Explanation of Development

Colin Leys (1977:1) states that anyone looking for the origins of the world system/dependency perspective on underdevelopment must begin his search in the writings of Marx and Lenin. Marxist economic analysis has a special interest in discrediting the "abstinence" theory of economic development. The Marxist analysis is more successful than the classical-neo-classical perspective for two reasons: First, by shifting the substantive concern from the need to save the costs of forces labor and the appropriation of surplus poverty, Marx effectively shifted theoretical concern from the study of the maintenance of internal equilibria to the study of disequilibria and recurring breaks in the developmental process that have enlarged rather than diminished existing inequalities. Second, Marxism has placed these discontinuities into the historical context of the imperialist and neo-imperialist expansion of capitalism, thereby demonstrating the connection between the history of Western modernization and Third World underdevelopment (Hobson, 1902; Lenin, 1939; Mandel, 1975). Change in the Third World was not an endogenous path through stages, but a process subject to powerful exogenous forces. Enormous income differentials and massive unemployment appeared as consequences of the progressive evolution of internal class divisions rather than balanced growth (Kay, 1975). Gutkind and Wallerstein (1976: 11) argue that inequality and unemployment indicate the negative interaction between internal and external developments in the peripheral colonial and neo-colonial economies. Vital to this interaction is the lack of internal sectoral and group linkages, or, more generally, the lack of internal economic differentiation. Rather, local elites control any possible transformation of the rural economy, subjecting its development to the requirement of the extractive-export sector without stimulating any backward linkages (Wallerstein and Gutkind, 1976:11). What emerges is a dualism that reveals a dialectical relationship between the "modern" export-import sector and the distorted "traditional" economy (Wallerstein and Gutkind, 1976:13). Moreover, the classes that have emerged in underdeveloped countries are "not reflective of an autonomous economy but [are] auxiliary to the world class structure" (Magubane, 1976:16).[2]

Although he is not considered as a Marxist economist, Gunnar Myrdal (1957) points out that on the other side of the spread effect created by the capitalist market is the backwash effect. Among the developed nations, class struggle and political processes have strengthened the spread effects, resulting in a more even distribution of development. In underdeveloped nations, the facilitating factors have been blocked, sectoral linkages have not been eatablished, and the distribution of income has been skewed in favor of the rich. Moreover, penetration by foreign investment has drained surplus through the repatriation of profits and interests, further contributing to the backwash effect of the uneven distribution of wealth (Chase-Dunn, 1975:722). The same type of analysis can be applied to the absence of trickle-down effects in the Third World. Adelmann and Morris (1973) show that inequality increases with growth in the Third World. Finally, dependent growth does not lead to the complex internal differentiation that is supposed to facilitate the trickling down (Furtado, 1972; Galtung, 1971).

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[2] From the dependencia perspective (Arrighi, 1970; Furtado, 1972; Girling, 1973), the class structure of underdeveloped countries is dominated by a small economic elite whose main loyalties are to foreign economic actors as a result of mutual interest in the control of production for export. The extremely unequal income distribution of the periphery (Kuznets, 1955; Kravis, 1960; Paukert, 1973) is attributed to this type of class structure (Kay, 1975). Historically, this type of class formation is the consequence of the state control, economic penetration and dependence that has characterized the core-periphery relationship in the world system (Chase-Dunn, 1975). By retarding the development of spread and multiplier effects (Baer, 1967; Furtado, 1972; Girvan, 1973; Singer, 1950), the structure also assists in the perpetuation of "dependent" growth.

However intellectually compelling the class-centered arguments may be, little systematic empirical work has been done to specify the link between economic dependency, class phenomena and economic underdevelopment (Delacroix and Ragin, 1976:8). Moreover, a substantial controversy exists in the literature over the appropriateness of measures of class structure used. (See Stavenhagen, 1975:19-39 and Kay, 1975 for summaries of the opposing views.)

In sum, the Marxist influenced economic analysis has revealed that the study of development and underdevelopment is predominantly a study of disequilibrium. There is a qualitative difference between the state of stationary underdevelopment and the process of sustained growth (Yotopolous and Nugent, 1976:5). The two "stages" do not belong to the same continuum. Underdevelopment is not a stage from which a country "takes off", rather, it is a distortion that aborts the indigenous developmental process and replaces it with one that suits the purposes of Western imperialism (See Baran, 1957:140-150.)

4. World-System Theory as an Outgrowth of Marxist Analysis

World-system theory organizes the Marxist-generated inventory of distortions associated with the expansion of capitalism (the general category to which imperialism belongs) on a global scale into a coherent world economic structure based on a functional and geographic division of labor. (See Wallerstein, 1972, 1974a.) Two consequences of this geographic division of labor are trans-national coalitions of economic interest that use non-market devices to ensure short run profits (Wallerstein, 1974b:403) and the direct movement of economic actors into positions of influence in the economics and politics of non-home countries. These effects have shifted the level of analysis from the nation-state to the world economy, at least conceptually.

From the world-system theory perspective, classical development theory represents a throwback to nineteenth century evolutionary theories of social change that merely shifts the substantive preoccupation from the development of Western Europe to the development of the Third World. Although some critics of the modernization perspective agree that an evolutionary perspective may be acceptable as a broad description of social history, they argue that its utility breaks down at the concrete "middle-range" level of empirical applicability. (See Portes, 1967:64.) Although modernization theory does focus on discontinuities and reversals in the developmental process, its formulation is so vague that testable hypotheses are difficult to come by. Modernization theory gives only tangential attention to external factors and avoids dealing with the exchange and confrontation, such as the penetration of national structures by multinational corporations, that take place within an integrated world system. Finally, as our overview of Africa's history graphically illustrates, the grafting of a theory of Western European development on to the situation in the Third World is highly misleading. The autocentric development of Europe could not have been replicated once the parameters of the world economy were defined. Consequently, the conceptualization of underdevelopment as the first stage of the evolution of a traditional society to a modern one totally ignores the historical context in which "modern" structural features have perpetuated weakness and stagnation in certain societies (Wallerstein, 1974a:350).

Africa offers a particularly good example of this process since at the time of its incorporation into the world system, it was neither inferior nor weak compared to the rest of the Old World (Amin, 1976:49). The contemporary relationship of Africa to the rest of the world, however, is one that subordinates the entire continent to the economic and political demands of the major Western powers. The position taken in this thesis is that an understanding of the mechanisms of the transformation of Africa can provide the basis for a more general theory of the transformations of any geo-political unit that result from its integration into the periphery of the modern world system.

5. The African Historical Context

The historical antecedent of Africa's political and economic relationship with the world system was established in the pre-mercantilist period of trans-Saharan trade (Amin, 1976:50). During this period the importance of exporting gold, ivory and slaves was that these exports provided the indigenous ruling classes with a means of procuring scarce luxury goods that assisted in the strengthening of their established social and political power (Wallerstein, 1976:21). To the extent that the trade contact between the various African systems and the European world-economy was a trade in luxuries, the two systems were in each other's "external" arenas, and, as indicated by the negligible effects of the frequent stoppages of trade before 1700, the consequences of this luxury trade were small. As soon as the trade shifted into an exchange of essentials, however, the two arenas became a single division of labor (Wallerstein, 1976:31).

Historians of both the right (Oliver and Fage, 1973) and the left (Amin, 1976; Wallerstein, 1976) agree that during the eighteenth century the export slave trade began to have revolutionary effects in West Africa, shifting the centers of wealth and power in West Africa away from the trans-Saharan routes of the Sahel towards the coast. The interpretive difference lies in the general effect of this shift and in the extent of European involvement.

Fage and Oliver suggest that the direct European share was negligible (1973:123). With the exception of early Portuguese missionary work in Benin, the Congo and the Cape Verde Islands and some settlement on the Gold Coast and at the mouth of the Senegal, Europeans in West Africa "were interested solely in exporting its produce, and in effect only in the slave trade" (1973:124). The principal effect of the coming of European traders to the coast was the stimulation of the well-established 'Sundanic' civilization in Guinea (Fage and Oliver, 1973:126). For as long as the commercial relations between Africa and the world economy remained centered upon the slave trade, "it was inevitable that contact should be slight and influence indirect ... [because] the slave trade was so profitable that it discouraged almost all attempts to develop other kinds of commerce" (Fage and Oliver, 1973:137).

In contrast to Fage and Oliver's position, Wallerstein argues that the period between 1750-1900 demarcates an important change in the significance of the slave trade. "Slave exports from Africa had certainly now ceased to be a "luxury" item from the point of view of the capitalist world economy" (1976:32), and the expansion of the slave trade from about 1700 was effecting the social structures of the exporting regions (1976:33). The coastal regions of Africa were, at this point, being "incorporated" into the world economy and thereby becoming peripheralized (1976:33).

From the world-system perspective, the mercantilist period (1750-1900) brought a two-edged expansion of Europe's economic activity in Africa. This expansion accounts for both the quantitative increase in the demand for slaves and the need to include new areas of primary production. From about the sixteenth century, Europe had been evolving through an internal process that consisted of the destruction and replacement of the pre-capitalist (feudal) modes of production with capitalist modes. The Industrial Revolution was preceded by an agricultural revolution that simultaneously increased agricultural productivity and released part of the labor force for employment in urban areas. This selective relocation of labor created an urban market for the agricultural surplus that was generated by the increased agricultural productivity and established the conditions for autocentric industrialization. It was only when the possibilities for capitalist expansion on this basis were exhausted that capital expanded on a world scale seeking profits and new markets (Amin, 1976:187; Leys, 1977:92).

The profit versus market-seeking motives presented Europe with somewhat of a dilemma in Africa. On the one hand, the import of slaves was essential to production, though, ultimately, the slave production in West Africa proved less profitable than cash-crop production. The solution was the gradual phasing out of the slave industry in Western Africa, accompanied by the introduction of agricultural technology. By transferring the external arena of slave recruitment to the East African Savannah the demands for slaves was met without disrupting the conversion of West Africa to cash crop production (Wallerstein, 1976:36).

For the most part, the peripheral zones of West Africa retained their local sovereign political institutions until the middle of the nineteenth century when the combination of growing European versus African competition for African markets and the growing challenge of German, French, and American industry to the British world-market hegemony resulted in the formalized partitioning of Africa (Wallerstein, 1976:39). According to Wallerstein, the result of this formalized partitioning was a second wave of the integration of Africa into the world economy. This integration was more extensive, more intensive, and it reorganized the African class structure, thereby altering the social organization of Africa's exporting regions (Wallerstein, 1976:32-33,39). The progressive weakening of the African state structure corresponds to the maturation of Africa's permanent relationship with the expanding capitalist economy.

Fage and Oliver present a different interpretation of European motives in Africa. Before the middle seventies of the nineteenth century, the whole trend of European thought was against expansion, and certainly "for the first three-quarters of the nineteenth century, the history of Africa is by no means synonymous with that of Europe in Africa" (1973:147). In 1879, the year of the French advance into the Sudan and the British move to open the Niger, West Africa was still largely free of European penetration and "little had yet been done to bring West Africa into the European fold" (Oliver and Fage, 1973:160-162). Algeria was French, French Senegal and the British Gold Coast were colonially administered, the British colonies of Gambia, Sierra Leone and Lagos were only small enclaves. There was some Portuguese influence in the area to become Portuguese Guinea, Gabon was a small naval station, and apart from five or six coastal towns, Portuguese Angola and Mozambique were ill-defined trading preserves. "North of Mozambique, even the coast was still virtually untouched by European political power" (Oliver and Fage, 1973:184). The only deep penetration was in the extreme south of Africa (Oliver and Fage, 1973:186).

According to Oliver and Fage, the partition of Africa was by no means a necessary consequence of the opening up of Africa to European influence during the first three-quarters of the nineteenth century (1973:186). Moreover, the motive behind the partition was certainly not economic imperialism, because early twentieth century Europe was in no need of an increase in African products, and African markets accounted for a negligible proportion of European exports (1973:200). The colonial governments did not change their minds until the period between the first and second world wars (1973:211). Beginning in the 1940's, the colonial powers began financial assistance to stimulate African economic development (1973:219).

Regardless of which side of the historical argument one comes down on, there is a distinct difference between the autocentric development of the European center of the world economy and Africa's movement into the periphery. This contrast reflects the external source of

Africa's development initiative and its dependent integration into the world system. Whether one dates the incorporation of Africa to the end of the mercantilist period or to the period following the second world war, it was at the impetus of the core that Africa began to function as a peripheral export sector, providing raw materials and food production at low costs and high profits. Because the African infrastructure was designed to get raw materials out for processing, economic links were established with international capital rather than with indigenous economic sectors (Ehrensaft, 1971). Because these externally-oriented linkages transferred demand to the international economy, the multiplier effect of development of the export sector on inter-sectoral demand was weakened with the result that Africa's economic integration was retarded (Singer, 1971).

In contrast to the stages of European industrialization, external manipulation replaced agricultural revolution as the precursor of industrialization in West Africa. Traditional modes of subsistence farming were juxtaposed with modernized export crop production. The increasing pressure of export crop production on the land combined with a high displacement of rural labor to produce massive unemployment and low rewards to labor that further encouraged foreign capital to concentrate and establish "modern" export sectors (Amin, 1976). In sum, the center's emphasis on exporting activities in the allocation of both financial (capital-intensive versus labor-intensive) investment and technological investment "extraverted" the peripheral economy and established export-sector dominance (Amin, 1976:20). In this way, the underdevelopment sequence gradually took shape as the external economic market structure assembled the conditions for the periphery's complete dependent integration into the world system and the corresponding weakening of its state structures (Mandel, 1975:346).

Africa's integration into the world system was expedited by the core's maintenance of local elites as "transmission belts" of exploitation (Amin, 1976:327). In return for political support and the appropriation of some tribal lands, local elites assured a smooth functioning of the economic status quo. During the colonial period, for example, the reorganized class structure combined with direct political domination to multiply the means available to capital to attain cheap exports by exporting both Africa's labor and her natural resources (Amin, 1976: 326). In Eastern and Southern Africa, where large supplies of labor were needed for mineral exploitation, local groups that were allied with international interests dispossessed entire rural communities and drove the residents back into confined "labor reserves" with no means of modernizing and intensifying their subsistence production (Amin, 1976). Less direct but equally as effective, were the "economie de traite" methods used by local allies in West Africa to "tempt" farmers into large-scale cash-crop production (Amin, 1976; Wallerstein, 1976).

To draw the general conclusions from the history of Africa's underdevelopment, we see that the world system has come to be defined by the extensive functional (occupational) and geographic division of labor that has unevenly distributed the range of economic tasks (Wallerstein, 1974:349) between the system's periphery and its core. Whereas autonomous growth in the core has meant development, dependent growth in the periphery has "disarticulated" the economy, resulting in a "development of underdevelopment" (Amin, 1976:292). The features that have come to define the core-periphery relationship are: (1) the siphoning off by the core of the periphery's surplus profits, (2) the core's exploitation of the periphery's labor and consequent massive unemployment in the periphery, (3) unequal exchange between the core and periphery, and more recently, (4) the emergence in the core of multinational corporations that have both maintained and extended the core's exploitation of the periphery by allying themselves with the periphery's bourgeoisie (Barratt-Brown, 1972:20-21; Mandel, 1975: 344-345).

The political implications of the integration of the periphery into the world economy is a pattern wherein state structures are relatively strong in the core and weak in the periphery (Wallerstein, 1974: 355). On the one hand, strong state machinery means strength vis-a-vis both other states in the world system and other political units within core states. One consequence of this strength is that the complex division of labor within core states resembles the organization of the larger world system. Another consequence is that the strong state is able to act as a partially autonomous entity to protect its competitive advantage by providing an ideological justification for the maintenance of existing disparities (Wallerstein, 1974:349). Finally, the strong state actively contributes to the widening of disparities by using a "tipping" mechanism where, after a point, strength creates more strength. For example, a large tax revenue enables a state to maintain a larger, more efficient civil bureaucracy and army, which in turn leads to greater tax revenue, more wealth, and more power (Wallerstein, 1974a:356).

The weak state, in contrast, has very limited potential for strengthening its position either internationally or vis-a-vis other local political units. According to world system theory, the weak state cannot prevent the penetration of its economy by the investment of foreign capital nor can it regulate the effects of this investment (C.F. Snyder and Kick, 1979:1099). Once the division of labor has been established, the world system functions as a parameter within which various relationships between core and periphery countries can operate but all with the same result: the development of core countries and the underdevelopment of the periphery.

This chapter has introduced the world-system perspective and its relevance to the explanation of Africa's historical exploitation and her contemporary dilemma of economic underdevelopment. Marxist economics may be criticized from a theoretical standpoint because its formulation has been predominantly a criticism of the weaknesses of classical economics and modernization theory. Although the Marxist critique has underlined the importance of considering exogenous influences, structural distortions and discontinuous change in the developmental process, its weakness is that it remains, to a large extent, a "negative" theory. It is rather fragmented inventory of valid criticisms, insights and historical analyese. One major contribution of world-system theory has been to supplement this disjointed inventory and organize it into a coherent picture of the world economy.

The impact of the world-system perspective on the academic community is evident in the increasing amount of empirical literature on development and underdevelopment that attempts to control (or at least acknowledges the need to control) for world-system position in its data analysis. (see Snyder and Kick, 1979:1101-1103 for a summary). Even within the modernization literature, empirical attempts have been made to reconcile the effects of external influence on internal change. (see Delacroix, 1976; Delacroix and Ragin; 1979). Borrowing from Flammang (1979), we will refer to this particular set of studies as "developmental".

The continuity of the world-system orientation to developmental treatments of economic growth is established by a common reaction to the neo-classical economic assumption that growth is largely a process endogenous to nations that occurs as an ordered sequence typified by the Western experience. To maintain this continuity, we will begin our review of the empirical literature, Chapter Two, with a discussion of the developmentalist attempt to incorporate world-system arguments into the modernization perspective.

CHAPTER TWO

REVIEW OF THE EMPIRICAL LITERATURE

I. Introduction

The developmentalist perceives "historical evolution ... [as] no longer being from traditional societies to modern societies, but rather from colonialism to independence, and [as] a shift away from Europe and America to an appreciation of Asia, Africa, and Latin America" (Irving Louis Horowitz, 1977:5). This statement of the developmentalist position has two theoretical implications related to the distinction between "traditional" and "underdeveloped". First, the statement emphasizes the relevance of the world system in the context of the shift from colonialism to independence. Second, the distinction leads one to question the Weberian causal chain between values and modernization. (see Smelser, 1964:264-65 for a summary of the derivation of the argument). Before we discuss the incorporation of the world-system arguments into the modernization thesis, however, some clarification of the world-system position is required.

One can distinguish at least three theoretical perspectives in the world-system literature: dependencia theory, world-system theory and dependency theory.

According to Duvall, the focus of dependencia theory is on the economic, social and political distortions of peripheral societies that result from or are reflections of the incorporation of those societies into the global capitalist system (1978:55). Largely a response to Latin American underdevelopment, this holistic-descriptive analysis of a historical process and its corresponding social-structural transformations demarcates a broad context of inquiry, avoiding and often rejecting the need for conceptual precision and measurement. Moreover, the arguments are not intended to be general formulations applicable to a wide range of situations and contexts, rather, they are descriptive statements whose validity is contingent on a particular context (Duvall, 1978:55-56).

That context is provided by the world system. The world system perspective suggests that international economic history may be viewed as the expansion of the capitalist world economy. In the world system, the three structural positions of countries, core, semi-periphery and periphery (Wallerstein, 1974:301-2, 349-50), are structures of economic inequality that reflect the refinement of a world-wide division of labor established in response to 16th century patterns of international trade (Wallerstein, 1974; Chirot, 1977). I. L. Horowitz is quite correct in his interpretation of historical evaluation as being from colonialism to independence, although this captures only a part of the sequence. Consider the African example.

The historical integration of Africa into the world-economy has left the remnants of colonial 'spheres of interest' policies which are still pursued in direct investments, trade and aid. The pattern of monopoly position in foreign direct investment, defined as 70% or more of investments controlled by one investing country, reflects nineteenth century colonial divisions. France had a monopoly position in 1967 in twelve African countries, two thirds of them former colonies and was close to monopoly in two others. Four of twelve were highly penetrated.[3] The UK occupied a similar position in eight African countries (nine including Rhodesia) and half were highly penetrated (Hveem, 1975:68). This does not mean, however, that metropolitan interests have been stabilized in a permanent division of Africa, rather, Africa's position has been stabilized in a permanent relationship with the metropoles.

In contrast to the dependencia approach's anti-empiricism, the mechanisms that reinforce structural barriers against economic growth in the periphery indicate that these labels are not merely descriptive, as the dependentistas suggest, but are measureable and essential components of economic growth. The attempts at specification of the mechanisms of the world system, in terms amenable to empirical interpretation, can be loosely amalgamated under the headings of dependency theory.

To some extent the distinction between world system theory and dependency theory is artificial. The two are so closely related that it hardly makes sense to discuss one without reference to the other. The trend has been to treat the distinction as unimportant and apply either theory as a simple line of argument (Delacroix, 1977; Snyder and Kick, 1979). However, dependency theory focuses on a specific subset of the world system structure, that is, the analysis of the mechanisms of linkage. The parameters defined by position in the world system, within which the dependency relationships operate, are incorporated largely heuristically.

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[3] High is defined as over 18% of GNP. That is average for stock of private direct investment in Africa as a whole.

II. Rethinking Modernization Theory in the Context of a World System

Only three major empirical papers informed by the developmentalist perspective have been published recently. One paper tests the universality of the modernization thesis and appears in a journal edited by I. L. Horowitz (DeViney and Crowley, 1978:23-39), the other two appear in sociological journals (Delacroix, 1977:795-808; Delacroix and Ragin, 1978:123-150). All three studies place substantial emphasis on the earlier theoretical critiques done by Portes, and are similarly subject to the criticisms associated with accepting the assumption that values are, in fact, related to economic growth (c.f. Chapter One). As we indicate below, this assumption is only one of numerous weaknesses in the literature.

DeViney and Crowley (1978) report the results of a factor analysis on three subsamples of countries that correspond to Horowitz's First/ Second/ and Third World typology (see Horowitz, 1972b:63-71). Their inability to reproduce the negative or mirror-image scores of the modernization factor for the complete sample in the Third World sample, as compared to very similar total and First World results, provides limited support for the developmentalist claims. DeViney and Crowley suggest that those variables tapped by modernization do not explain events within the Third World (1978:29).

An earlier analysis done by Delacroix lends support in the other direction. Working from the Inkeles and Smith emphasis on the efficacy of education and the mass media as modernizing institutions (1974:283), Delacroix posits an indirect effect of raw material specialization on economic growth (measured by log GNP per capita 1970) for an undefined set of Third World countries, via the direct negative effect of raw material exports on educational expansion (1977:802). His findings are rather dubious, however, when one notes that Delacroix based his interpretation on a beta of .17 for 'secondary enrollment as a ratio of total enrollment, 1955' that is not quite significant at the .05 level (significance level=.06), while he dismisses a beta of .11 for 'level of transformation of exports, 1955' that is almost significant (significance level=.11) in the regression equation.

The third study (Delacroix and Ragin, 1978), operationalizes Portes' (1973b) argument that where modernization is 'Westernization', it retards economic progress by instilling attitudes, such as excessive needs to consume, that are inappropriate in a 'developing' country. Delacroix and Ragin suggest that exposure to western cinema is an example of westernization clothed in the guise of a modernizing institution, and their findings of a significant negative effect on growth (beta=-.22) of the extent to which populations have been exposed to western films is interpreted by the authors as support for Portes' point (1979:141).

Delacroix and Ragin control for world system position by including two trade measures in their equation: value of finished imported goods circa 1953 as a proportion of the value of all imports and the value of raw materials exported circa 1953 expressed as a proportion of the value of all exports (1978:135). That these two measures of world-system position have no effect on economic growth (measured as GNP per capita change) is of "little substantive interest" to the authors "since the equation is not intended as a test of world-system theory" (1978:139).

It seems reasonable, however, to assume that if the exclusion of explicit controls for economic dependencies in their model, might lead the authors to interpret wrongly any spurious negative relationship that might exist between Western film measures and economic growth, Delacroix and Ragin would, at least, want to use valid measures of world system position. Moreover, the structure of foreign trade after 1953 was about to exhibit a rapid overall reversal of the pattern of gradual growth in the importance of foreign trade in the under-developed world. Between 1954 and 1962, there was a deterioration in the terms of trade of the Third World and a generally large deficit in their trade balance that reinforced the need for foreign aid and investment (Bairoch, 1975:93-85).

Snyder and Kick (1979) offer the only serious attempt at addressing the problem of measuring world-system position. They present a block model of the world-system circa 1965 that is based on four types of international networks: trade flows, military interventions, diplomatic relations and conjoint treaty memberships. Their block-model provides strong evidence for a core/semi-periphery/periphery structure in the world-system.

III. Dependency Theory: The Empirical Application of the World-System

The dependency literature operationalizes core-periphery relations in terms of two distinct types of economic dependency: (1) market dependency, which "involves participation in world capitalist markets in such a way that a nation's economy is strongly affected by what is happening in the metropolitan capitalist economies," and (2) economic power dependency, "in which a nation's economy is significantly conditioned by the decision-making power of certain individuals, firms and agencies from the capitalist metropoles" (Weisskopf, 1976:3-4). Although the studies consistently claim that their models start from the world-economy versus national level of inquiry (Rubinson, 1976:639; Chase-Dunn, 1975:721; Bornschier et al., 1978:651-643), one finds no precise criteria for specifying world-system position, nor does one get any strong indication that the core/semi-periphery/periphery model characterizes the operation of the system as a whole (Delacroix and Ragin, 1976; Snyder and Kick, 1975). Often world system position is defined as level of development, although it is obvious that multiple dimensions underlie the concept of position (Chirot, 1977; Galtung, 1971; Snyder and Kick, 1979; Wallerstein, 1974). "Put another way, empirical treatments have no clear way in which to validate either the specified number of positions or the structural relations among them" (Snyder and Kick, 1979: 1101). These issues are less problematic for dependendistas because the world model is explicitly a heuristic device.

IV. The Dependency Literature

(i) Market dependency: trade dependence and level of development

Ricardo's principle of comparative advantage (1971:147-67) states that all countries will maximize their economic growth through trade, regardless of differential resource endowment. Underdeveloped countries are poor in the sense that large segments of their populations subsist at low wage levels, resulting in an excess or underemployment of labor (Delacroix and Ragin, 1976:3). Coupled with a random distribution of primary products (coffee, cocoa, bananas, tin, copper, etc.), one would expect this abundance of cheap labor to result in the less-developed countries concentrating on the export of labor intensive commodities processed from available natural resources (Cairncross, 1962; Mandel, 1975:59). Concomitantly, the rich developed countries would export processed goods such as industrial equipment and consumer durables that required capital-intensive versus labor-intensive production. The problem with this model is that it excludes a second structural feature of the division of labor that is based on the principle of comparative advantage. This is the concentration of production on one or two export commodities that is avoided by the rich countries because of a decrease in the importance of natural resources relative to labor costs that has allowed them to diversify their overall production. Most classical economists recognize the possibility of unequal growth due to the maximization of benefits derived from unequal resource endowment; however, the responsibility of trade for underdevelopment is foreign to the comparative advantage perspective (Delacroix and Ragin, 1975:5).

In contrast, the Marxist-inspired literature has argued that trade is likely to impede the structural differentiation of poor countries, consequently lowering their economic growth below their theoretical potential (Delacroix and Ragin, 1976:17). The two implications drawn from the comparative advantage argument are that primary product specialization minimizes sequential linkages while commodity concentration limits lateral linkages in the economy. As early as 1949, the United Nations Economic Commission for Latin America (ECLA) began warning that there would be adverse effects of concentrating on the export of one or two primary products and using the earned foreign exchange to import industrial and consumer goods (Stallings, 1972:38).[4]

As outlined by Stallings, the two basic ECLA arguments were, first, that the large price fluctuations for primary products in the world market would result in unstable foreign exchange earnings, impairing the exporter's capacity for long-term developmental planning (1972: 38). Second, peripheral countries exporting primary products were at a continual disadvantage vis-a-vis the industrialized center because the secular price trend for industrial goods was increasing while corresponding prices for raw materials would decrease due to a relative decline in demand. The increasing inelasticity of demand for raw materials would result in lower per unit prices rather than increased income (Furtado, 1965; Galeano, 1971:218).[5]

Although Mandel (1975:58) has refuted the historical necessity of a secular decline in primary product demand, the weight of empirical evidence (as cited by Delacroix and Ragin, 1976:7) does not support the price fluctuation argument. In contrast to the hypothesized secular deterioration in the relative prices of primary products (terms of trade), there was an improvement in prices until 1950/54, followed by an adjustment, rather than a downward trend (Bairoch, 1975:123-129). Ratios of commodity concentration and raw material specialization continue to

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4. ECLA's alternative strategy was "desarrollo hacia adentro" (inward-looking) development (O'Brien, 1973:8). Desarrollo hacia adentro proposed industrialization behind high protective barriers with the assistance of state planning. This is the strategy of "import-substitution"; the setting up of industry to satisfy demands previously met by imports.

5. The Organization of Petroleum Exporting Countries have effectively negated this argument.

litter empirical "tests" of dependency theory, reappearing consistently among the indicators of trade dependency (Stallings, 1972; Vengroff, 1977; McGowan, 1976; Kaufman et al., 1975; Walleri, 1978, Tyler and Wogart, 1973). Working under the general assumption that dependency theory predicts a negative association between dependence and indicators of economic growth and development (McGowan, 1976:27), the consistent findings that commodity concentration and export specialization are largely unrelated to growth leads Vengroff and Kaufman et al. to advise considerable caution in accepting dependency hypotheses.

A second aspect of trade dependency concerns the degree to which a single metropolitan country dominates the flow of trade (Stallings, 1972:6-7). Operationalized in the literature as trade partner concentration in imports or exports, this measure is designed to tap effects of the colonial legacy. Recall that the dependency relation is generally agreed upon to reflect an asymmetrical structure of control (Duvall, 1978:52, McGowan and Smith, 1978:179) in which a nation's economy is significantly conditioned, not by world capitalist markets in general, but by the decision-making power of the capitalist metropole specifically (Weisskopf, 1976:4). André Gunder Frank argued that peripheral "satellites" experienced the greatest economic development where their ties to the metropole were weakest (1972). The crucial feature was "internal colonialism" (see T. Shaw, 1977), the transfer of resources from the exploited backward sectors of the economy to the sector linked to the market requirements of the metropole (Tyler and Wogart, 1973:38). Empirically, this dependency relationship has been operationalized in terms of general patterns of trading-partner concentration or proportion of trade to the ex-metropole specifically, with adverse effects measured, in part, by the balance of deficits in trade (Kaufman et al., 1975; Tyler and Wogart, 1973; Walleri, 1978; Stallings, 1972; McGowan, 1976; Vengroff, 1977). McGowan finds a weak association between partner concentration and poor economic performance in Black Africa, but it is negated by strong contradictory evidence suggesting that high reliance on foreign trade was correlated with good economic performance at least in the 1960's (McGowan, 1976:31). Tyler and Wogart (1973) find no significant relationship between partner concentration and growth.

Paradoxically, only McGowan and Weisskopf have noted the dubious validity of the trade dependency variables themselves. If the ratio of total foreign trade to GNP (McGowan's "trade" variable), export concentration and specialization and partner concentration are indicators of dependence, one would expect a strong, positive correlation between them. McGowan's failure to find this correlation indicates that with the possible exception of partner concentration, the measures of trade dependency cited extensively in the literature, do not represent a single underlying dimension of economic dependence (McGowan, 1976:38-39). In this context, it is questionable whether the empirical "tests" of dependency theory are actually testing what they purport to test.

A second validity problem with the measures of trade dependency in the empirical literature concerns the exclusion of import-related variables from the analysis. Perhaps the poor performance of import-substitution policies has deflected academic interest away from the significance of imports as measures of trade dependency, however, it should be kept in mind that import-substitution was from the beginning an unviable alternative to export-centered development because the strategy was derived from false assumptions about the future of primary-product exports in the world economy. A second reason for omitting import variables may be related to the small contribution of Third World markets to the total of the foreign markets of the developed countries (nineteen percent in 1970, 28 percent in 1958) (Bairoch, 1975:104).

The composition of imports consists essentially of new machinery and equipment, raw materials to operate industry and food and/or agricultural requirements such as fertilizer (Pearson et al., 1969:49). We will look at the distribution among these categories. The rising deficit in the cereal trade of underdeveloped countries (eight percent of total cereal production in 1972) has been accompanied by a rapid increase in the cost of food imports in spite of the significant share that has been provided as gifts or at reduced prices (Bairoch, 1975:43). The cost of cereals, estimated at $8000 million in 1970 at value c.i.f. is five times more than the value of the exports of manufactured goods from underdeveloped countries in 1970, even based on 1975 prices (Bairoch, 1975:44). Certainly the domestic manufacturing sector has not been able to provide the means of payment, and this has meant that alternative means such as the borrowing of foreign capital have been used to balance deficits in the terms of trade.

The share of capital equipment imports may also indicate trade dependence. Ninety percent of fixed capital equipment is imported (1975: 175-76). The lack of import/export balance is evident in the 1970 figures, where imports of machinery amounted to a total value of over nineteen billion dollars (U.S.), while exports formed no more than one billion, half of which are destined for other underdeveloped countries (Bairoch, 1975:175).

It may be, on the other hand, that the measurement of market dependency is not a central issue in the empirical investigation of dependency. As Weisskopf suggests, economic power dependency is what the dependency literature is really talking about, therefore any operationalization of the theory should distinguish it from market dependency. According to Weisskopf, market dependency is largely determined by the interaction between a nation's size, its natural resource diversity and its incorporation into the international economy (1976:5). Market-dependent nations are typically small, poor and lacking in diversified-export production (McGowan and Smith, 1978:214). Power dependency, on the other hand, varies considerably among the underdeveloped countries (McGowan and Smith, 1978), and is, to a large extent, connected with the operation of multinational corporations (Chase-Dunn, 1975; Bornschier and Ballmer-Cao, 1979; Moran, 1978:85). McGowan and Smith operationalize the market/power distinction by including measures of investment and aid among the trade indicators. Power dependency is indicated by the percentage of aid, investment and trade coming from the major donor/investor/partner, and market dependency is measured by commodity concentration, total foreign trade/GNP and total and per capita foreign investment (1976:213-214).

McGowan and Smith appear to be blurring a clear distinction between trade dependency on one hand and capital (aid and investment) dependency on the other. Most of the literature informed by dependency theory suggests that investment dependence is the structural feature of a national economy that gives some degree of economic and political power to foreign investors (Bornschier et al., 1978:653). Aid dependence is also viewed as creating a control structure by which international or bilateral aid agencies influence the governments that depend on them for resources (Chase-Dunn, 1975; Griffin and Enos, 1970; Papanek, 1973; Rubinson, 1976, 1977; Stevenson, 1972; Stoneman, 1975; Szymanski, 1976). Therefore, to be consistent with the literature (Rubinson, 1976:683), we refer to economic power dependency as a mechanism related to investment and aid, separating foreign direct control from dependence on external markets.

(ii) Economic Power Dependency: Investment and Aid

The most important study to emerge from the interest in power dependency is the Bornschier et al. (1978) paper on the effects of foreign investment and aid on economic growth and inequality. The paper presents both a thorough review of the related empirical literature and a sophisticated reanalysis based on the review. The main finding in the reanalysis is a long term negative effect of foreign direct investment and aid on the economic growth and equality of developing countries. Although this finding and the distinction between long and short term effects have been discussed previously (Stoneman, 1975:1; Beckford, 1971), the Bornschier et al. study is the first systematic attempt to incorporate this finding into the world system-dependency literature.

According to Bornschier et al. investment dependence is most often conceptualized as the extent to which a country's economy is penetrated and controlled by direct private foreign capital investment (1978:653). The operations of subsidiaries of multinational corporations or direct versus portfolio investment is the usual focus of interest (Chase-Dunn, 1975:734-735; Bornschier and Ballmer-Cao, 1979:488). "Aid dependence refers to the amount of foreign aid, both private and public, that a country receives" (Bornschier et al., 1978:654). In addition, debt dependence may be understood as an effect of aid, where foreign aid is extended as credit.

According to the Pearson Commission report on international development (1969), the credit component of aid had important implications for dependence but were not often considered. Compared to the cost of direct investment, the servicing of fixed interest funds is less flexible. Interest amortization payments must be met whether or not the projects funded by loans have successfully entered production. Profit remittances of multinationals emerge only with profitable domestic output. The result is that equity capital has a built in grace-period more favorable than loans and bonds. Moreover, the assumption that loan financing leads to less foreign control than equity investment may be incorrect. "Actually, fixed interest creditors are in a far stronger position with respect to national authorities than are foreign equity investors, who can often be influenced by fiscal, monetary, and other policies" (Pearson Commission, 1969:102).

The commission's comparison of aid and foreign investment may be somewhat of an overstatement, especially when one considers the benefits of extraterritoriality, tariff-jumping and monopolistic advantage available to the multinationals. However, the case for including aid as a measure of economic power dependency is well-taken.

As summarized by Bornschier et al., the findings about the effects of foreign investment and aid on economic growth are contradictory in the literature (see Table 3, page 665 in Bornschier et al., 1979). The effects of investment dependence on economic growth are positive in six studies, negative in eight. Six studies find positive effects of foreign aid on economic growth, while four find negative effects. Bornschier et al. reconcile these differences by differentiating between studies that measure dependency by short-term flows and long-term stocks. Current flows of investment capital and aid have positive effects whereas long-term stocks of foreign investment and aid have negative effects (Bornschier et al., 1978:667). This result is borne out by Bornschier (1975), Bornschier and Ballmer-Cao (1979), Chase-Dunn (1975) and Stoneman (1975). Bornschier et al. suggest that the two findings that do not fit this pattern (Griffith and Enos, 1970; Stevenson, 1972) may be accounted for by sampling error due to the small number of cases used, twelve and seven respectively (1978:667). Substantively, short term increases in growth are attributable to the contribution of capital formation and demand that results from land, labor and material purchases at the start of production, while long-run structural distortions are produced by the transfer of profits to MNC headquarters (Bornschier et al., 1978:667).

The four remaining studies that use measures of stock and find positive effects of foreign investment or aid on economic growth (Kaufman et al., 1975; McGowan and Smith, 1978; Ray and Webster, 1979; and Szymanski, 1976), focus on either Latin America or Africa only. In contrast, all the studies that use unrestricted geographic samples report negative effects (Bornschier, 1975; Bornschier and Ballmer-Cao, 1979; Chase-Dunn, 1975; Robinson, 1977; Stoneman, 1975). Sample composition, however, is not the explanation of the different findings (Bornschier et al.:669). Bornschier et al. conclude that the relationship between foreign investment and growth varies with initial level of development. Africa and Asia are generally among the most underdeveloped, while Latin American countries are much richer. "While the effect of foreign capital is negative within both poorer and richer developing countries, it is significantly more negative in richer than in poorer countries" (1978:675) and the relationship holds independent of geographical region (677).

Bornschier and Ballmer-Cao (1979) interpret the interaction of foreign direct investment with level of development in terms of a sectoral breakdown. They find that foreign investment in manufacturing has the largest negative effects on growth, while foreign investment in extractive industries (mining and petroleum) has positive effects. One possibility is that there is more extractive investment in the poorer countries. McGowan and Smith's (1978) argument that foreign direct investment has a smaller effect on the economies of the least developed countries because they lie outside the world system leads us to qualify this interpretation, however. On the one hand, the reference to countries lying "outside the world system" could be regarded as referring to countries in which the manufacturing sector is non-existent or extremely primitive. In this sense, no qualification of the Bornschier-Ballmer-Cao interpretation is necessary. On the other hand, this reference may refer to the fact that there is a floor or bottom line to underdevelopment (or to indicators of underdevelopment) and that in the case of countries which approach this lower bound the increase in foreign direct investment cannot make them any poorer.

Another way of putting this argument is that there may be some countries whose economies (or at least the monetized economy) are so primitive that any capitalist activity, whether foreign direct investment or otherwise, can only raise the country's GNP. This will register as a positive, or at least, benign effect on the country's development. The qualification that McGowan and Smith's argument leads to, then, is that in the case of the least developed countries the long-term effect of foreign direct investment on development will appear to be more benign and may even be positive. This is a possible explanation for why Bornschier et al. fail to find a long-term negative effect of foreign direct investment on growth for the complete sample of thirty African countries.[6]

V. World System Position

From the perspective of the world system/dependency theory, a country's economic growth is largely determined by features of the world economy as a whole. Snyder and Kick's (1979) operationalization of the world system structure identifies ten blocks (A through F) that specify three discrete structural positions (core, semi-periphery, periphery) according to a single (simultaneous) partitioning of four international networks: trade flows, military interventions, diplomatic exchange, and

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[6] A non-significant B of -.0002 is reported in Table 6 for 1960-1975, and a nonsignificant B +.0001 is reported in Appendix B (1979:671). Neither result is discussed in the text.

and conjoint treaty memberships. The image matrix for trade (1979:1113) most clearly reflects his three-tiered structure. Block C, the unambiguous core, maintains trade linkages to and from every other block in the syste, (1979:1114). At the other extreme, the periphery (block E through B) is, for the most part, integrated into the world economy only through its trade with core, block C. "This pattern indicates a peripheral location in the overall structure" (Snyder and Kick, 1979:1114). Substantively, the blockmodel patterning does not support Weisskopf's suggestion that market dependency is not a central issue in the empirical investigation of dependency; rather, the blockmodel suggests that trade is the most important dimension of transnational interaction.

Because level of development may be a proxy for position in the world system, rather than using it as the specifying variable in the interaction between position and effects of foreign investment, aid and trade, we will use Snyder and Kick's blockmodel partition of the world system into core, semi-peripheral, and peripheral positions. The Snyder and Kick model is potentially a breakthrough in the study of development for three reasons. First, the blockmodel lays out operational criteria for classifying countries according to location in the world economy, independent of level of economic growth. The resulting partition coincides closely with 'common sense' notions of how the world-system is set up; the rich, developed countries are in the core, and the poor-underdeveloped countries are not (see Table 1, Snyder and Kick, 1979: 1110). Second, the blockmodel is set up as a general structural account of the entire range of positional variation among countries. This makes the model representative of not only the "costs" of location in the periphery but also the "gains" of core position. Third, the blockmodel avoids the tautological problems that may result from using indicators such as investment dependence, level of economic development, trade concentration, etc., as measures of position in the world system.

Without exception, the countries occupying the most extreme peripheral position (blocks A and B) are African. Snyder and Kick mention that the differences between A and B countries may reflect substantively important variations in historical experiences, state strategies, etc., (1979:1116) however, the authors fail to connect the blocks with obvious historical and geographic divisions. Moreover, our analysis suggests that Snyder and Kick may be mistaken in their placement of block A closer to the core than block B, at least in terms of trade linkage networks. These points will be elaborated on in the methods discussion, in the next chapter.

VI. Summary

In our review of the empirical literature we have attempted to draw a distinction between operationalizations of core-periphery relations in terms of market (trade) and power (foreign investment and aid) dependency. Bornschier et al. (1978) and Snyder and Kick (1979) stand out as the two most important empirical studies to date.

Bornschier et al. offer a systematic review of findings and a reanalysis of data on the effects of foreign direct investment on growth. Although they fail to replicate the results for thirty-three African countries, the authors report a general difference between short-term effects of flows and long-term effects of stocks of foreign direct investment. In addition, Bornschier et al. find an interaction of the negative long-term effects with the richer developing countries.

Snyder and Kick offer the only serious attempt to operationalize the world-system structure, and that their analysus will assist us in explaining the Bornschier et al. interaction. The weakness of the Snyder and Kick paper is its failure to specify how the structural relations among positions (exploitative links between core and periphery or dependency relations) operate. Although there has not been one particular study of trade dependency that compares in both sophistication and clarity to these two studies, the collection of findings should provide some guidelines on the effects of market dependency on economic growth.

CHAPTER THREE

METHODS

I. Research Design

A. Panel Regression Analysis

Delacroix and Ragin suggest that if one examines indicators of development over time, one will be struck by the remarkable stability of cross-national inequality regardless of the indicator of development used (1977:26). The study of change in the level of development, therefore, requires a design with a sufficiently long period to allow meaningful differences between countries to be discerned (Delacroix and Ragin, 1977:27; Bornschier et al., 1978:678). Moreover, even if the time period selected is historically homogeneous enough to allow for the observation of normal trans-national exchanges, it may be possible that these relationships are conditional on the relative expansion and contraction of the world economy as a whole (Bornschier et al., 1978:679). Finally, the time period must be consistent with the data that are available for a reasonably large number of countries to allow sufficient comparison. We are aware of the desirability of a longitudinal study of many countries over a comparable time period. The third constraint, however, the availability of data on African development, has placed several limits on the scope of this research.

The research design used in this study is a panel step-wise multiple regression analysis of cross-sectional data on twenty-three to twenty-eight African countries. The dependent variable is a percentage change score in GNP (1965-1975). With the exception of gross capital formation in 1960, all independent variables included in the equations are measured between 1965 and 1970.

The flexibility of panel regression analysis is evident in two characteristics built into the design. First, panel regression allows the introduction of multiple independent variables and second, it employs data measured at different points in time, thereby reducing the likelihood of false causal inferences due to reciprocal causation (Chase-Dunn, 1975:726). One interesting aspect of using data at various time periods is that one may, for theoretical reasons, regress a variable measured at an early time point on a variable measured later if one believes that the later variable picks up long term effects that predate the effects picked up by the earlier variable. This point reflects the methodological position in this thesis. Theory, rather than statistical technique, should dictate the formulation of the problem. For this reason, our approach data analysis is one of applying relatively rigorous statistical procedure to the data while weighing, at each step, the costs of both the formal assumptions that may be violated, with the fit of the results to the theory and related empirical findings discussed below.

B. Selecting the "Best" Regression Equation

The selection of a linear regression equation for a particular dependent variable Y in terms of "independent" or predictor variables $X_1, X_2, \ldots, X_k$ usually involves two contradictory criteria:

1. to make the equation useful for predictive purposes, the model should include as many X's as possible to determine reliable fitted values, and
2. because of the costs involved in obtaining information on a large number of X's and

> subsequently monitering them, the equation should include as few X's as possible.

Draper and Smith (1966:163) suggest that the compromise between these criteria is what is usually called selecting the best regression equation. Of the several procedures in current use, backward elimination, forward selection, and stepwise procedures are the most relevant to our analyses.

The basic steps in the backward elimination procedure are to compute a regression equation containing all variables, allowing the regression procedures to force an ordering of the variables. A partial F-test (F_1) is calculated for every variable as though it were the last variable to enter the equation; then the lowest partial F-value is compared with a preselected significance level (F_o). If F_1 is less than F_o, the variable X_1 is removed and the equation is recomputed with the remaining variables (Draper and Smith, 1966: 167-168).

The forward selection procedure attempts to achieve a similar conclusion working from the other direction. Forward selection inserts variables in turn until the equation is satisfactory. The order of insertion is determined by using the partial correlation coefficient as a measure of the importance of variables not yet in the equation. The basic procedure is to select the X_j most correlated with Y (in our analysis, X=LGNP, 1965) and find the first order linear regression equation, $\hat{Y}=f(X_1)$. Next, we find the partial correlation coefficient of another $\hat{X}_j$ ($j\neq 1$) and Y after allowing for X_1. Mathematically, this is equivalent to finding the correlation between (a) the residuals from the regression $\hat{Y}=f(X_1)$ and (b) the residuals from any other regression $\hat{X}_j=f_j(X_1)$. The X_j with the highest partial correlation coefficient with Y is now selected (suppose it is X_2) and a second regression equation $\hat{Y}=f(X_1, X_2)$ is fitted and the process continues. At each point of re-estimation, the variables entered previously are, in effect, controlled for in the equation. As each variable is entered into the regression, the following values are examined: R^2 (the proportion of explained variance) and the partial F-test value for the most recently entered variable (Draper and Smith, 1966:169). The drawback of this procedure is that it makes no effort to explore the effect that the introduction of a new variable may have on the role played by a variable entered at an earlier stage. This deficiency is overcome by the stepwise procedure.

The improvements made by the stepwise procedure on the forward selection procedure involves the re-examination at every stage of the regression of the variables incorporated into the model in previous stages. Because the best single variable to enter at an early stage may, at a later stage, be superfluous in light of the relationships between it and other variables now in the equation, the partial F criterion for each variable in the regression at any stage of calculation is evaluated and compared with a preselected percentage point of the appropriate F distribution. This provides a judgment on the contribution made by each variable as though it had been the most recent variable entered, irrespective of its actual point of entry into the model. Variables providing a nonsignificant contribution are removed, and the procedure continues until no more variables will be admitted to the equation and no more are rejected (Draper and Smith, 1966:171).

C. Violation of Linear Regression Assumptions

The use of stepwise multiple regression allows the introduction of multiple independent variables, however, the issue of the compatibility of the assumptions of the linear regression model with the variables used and their measurement needs to be addressed. As suggested by Nancy Esteb (1977:18) four parts to this issue are:

1. size of nation, aggregation and heteroskedasticity
2. associated independent variables and multicollinearity
3. data inadequacies
4. sample sizes

A fifth related problem, autocorrelation will be discussed below in the section on measurement (IIA).

1. Size of Nation, Aggregation and Heteroskedasticity

The high association between concepts of world system research and the size of a nation (e.g. GNP per capita, commodity production) can result in a non-uniform variance of the error terms among observations, or heteroskedasticity. Heteroskedasticity is a more difficult problem when it is related to the independent variables, and we can expect a certain amount of heteroskedasticity in the aggregate data reported in data sources due to the aggregation of data on units of different sizes. Another point is that it is reasonable to assume that the variance among the low-income nations sampled will be attenuated if only because these nations are close to the floor of GNP.

Esteb suggests that if heteroskedasticity arises from size of nation differences, the error term probably has a variance proportional to a quantifiable variable (1977:9). More efficient estimates can sometimes be derived by transforming the variables by dividing each by the value of an independent variable highly associated with size. Following Esteb's suggestion, we have standardized the residuals of the independent variables and have weighted the variables on the size of the economy. Norming the variables on size of economy (GNP per capita, PFI as a % of GNP) is also the procedure used to control for heteroskedasticity in the dependent variable, change in GNP 1965-1975, which is measured as a percentage of GNP level in 1965.

The problem of comparability is solved by weighting variables to control for differential unit size, is the issue of comparability. For example, the same amount of private foreign investment that has little effect on the formation of capital in a large economy may account for the major portion of gross capital formation in a small economy. In some cases, private foreign investment (PFI) may be a proxy for gross domestic capital formation. The weighting of variables to control for comparability problems (as is evident in the example above) is only a partial solution. Again, we emphasize the importance of theory and of relating the findings to the real world. In the case of private foreign investment, taking PFI as a percentage of GNP only gives the researcher some idea of the proportion of 'ownership' and 'control'.

2. Associated Independent Variables and Multicollinearity

The variables associated with a disadvantaged dependency status, such as productivity of the export sector, proportion of imports to exports, and control over investment capital, will tend to be intercorrelated (Esteb, 1977:10). When two or more highly correlated ($r>.50$) variables are used as independent variables in an equation, loss of precision will result due to problems of multicollinearity. For this reason, the linear model requires that the independent variables not be highly correlated.

The problem of multicollinearity is evident in our inability to enter VAR449 (gross capital formation as a % GDP in 1960) and IB2V449 (the interaction between capital formation and world system position B_2) with VAR469 (PFI as a % GNP in 1967) at the same time in the regression. As suggested in our discussion above, we will assume that highly correlated variables are representing the same thing. The procedural implications of this assumption are that we have run each variable separately, looked for differences in the results, and then, we have chosen the equation that best represents the theory. This has entailed a judicious and careful use of the stepwise regression algorithm with the F-values set relatively low because of the possibility of suppressor effects (the presence of suppressor effects will be discussed below under the heading of Analytic Strategies).

3. Data Inadequacies

The pragmatic task of collecting the data needed for all cases for every variable is probably the most difficult problem confronted by the world system researcher. The inevitable loss of cases means a loss in efficiency if variance in the independent variables are thereby decreased, although the loss is less if it can be assumed that the mean of the missing values is close to the mean of the data (Esteb, 1977:12). One solution for missing value problems is the use of proxy variables. Esteb advised that care should be taken because the proxy will measure the influence of all variables not included in the equation that have non-zero correlations with the proxy (1977:12). The upward bias in parameter estimation will decrease with the goodness of approximation.

The data set is not overly plagued with missing values. Only four cases were lost because of data missing on trade variables, and the gaps were not randomly distributed. That is, those cases that missed on one variable were the cases that missed others. The four cases lost by list-wise deletion (cases eliminated if at least one variable was missing) were Botswana, Guinea, Burundi and Lesotho.

4. Sample Size

Although much time in the methodological literature is devoted towards discussions of the increase in coefficient sensitivity to specification error that results from breaking the linear regression models' assumption for small or moderate samples (see Esteb, 1977:13); the more relevant problem for the world system researcher is the problem of using too large a sample. This is one difficulty with the Bornschier et al. paper (1978). When one is attempting to isolate those mechanisms that contribute to development, analysis on large heterogeneous samples may obscure the operation of different causal processes. The dependency literature has fundamental problems dealing with this issue because on the one hand they want to argue that the same historical process led to the development of the core and the underdevelopment of the periphery. On the other hand they are adamant in their criticism of the modernizationists for imposing a model applicable to the economic development of Western Europe on the economic underdevelopment of the Third World.

Some researchers have attempted to differentiate causal processes by subdividing large samples into rich/poor or regional groupings, however, there has been no careful, systematic analysis of partitions of the world-system based on the divisions implied by the related substantive discussions.

In our analysis, we consider only African countries, and the sample is partitioned according to a division using the correspondence between Snyder and Kick's (1979) blockmodel of the world system, geographic divisions and the historical discussions of Africa's incorporation into the world economy. The basic sample consists of 33 countries: four cases were excluded from the analysis because they were outliers on the distribution of the dependent variable, and two cases are missing on the measure of CHANGEGNP.

II. Measurement

A. Measuring Level of Development

In accord with Kuznets (1964; 1968), we used GNP per capita in 1965 (taken as a natural log) as our indicator of initial level of development. Finsterbusch (1973) has shown that, despite numerous criticisms, GNP per capita correlates very highly with a large number of diverse, conventional indicators of development. The two central reasons for not using GNP per capita as an indicator of development, however, warrant some attention. Jenkins (1970:36) argues that GNP per capita overestimates the developmental gap; a problem of little concern to us because we are studying changes in levels of development. According to Delacroix and Ragin (1976:42) it is frequently argued that apparent economic growth among poor countries might simply be a reflection of improvements in national accounting procedures. Delacroix and Ragin suggest that such improvements are less likely to occur in the absence of growth, moreover, a close examination of the reported growth of those poor countries they trust least does not reveal a patterned difference between growth rates reported by the countries they trust most (such as, India, Egypt and Pakistan) (1976:42).

CHANGEGNP, our dependent variable, is a ratio variable that measures economic growth by subtracting the level of GNP in 1965 from the level of GNP in 1973 and expressing this sum as a percentage of the GNP level in 1965. Although our larger concern is with development rather than growth, and economic growth is an imperfect proxy for development. Similar to other studies in the area, we are constrained by the availability of published statistics, and we are, more or less, left no alternative than to use data on growth rates. One consolation is that it is generally accepted that the 'rate' of economic growth is a more appropriate dependent variable than level of national income or GDP, etc. (Stoneman, 1975:13).

It is argued (as summarized by Chase-Dunn, 1975:727), however, that the use of ratios as indicators may lead to faulty inferences, particularly if independent and dependent variables share common terms. One relevant problem for our analyses occurs because two measures that contain a similar term which is in the denominator of one (difference between GNP in 1975 and GNP in 1965 as a percentage of GNP in 1965) and the numerator of the other (log GNP per capita 1965) will have an artificially negative correlation (Schuessler, 1974). The extent to which this is true depends on the variances of the terms (Fuguitt and Lieberson, 1973; as cited by Chase-Dunn).

Chase-Dunn (1975:727) suggests that estimating the effects of dependence on development, artifactual negative effects may arise because dependence measures are standardized on GNP to control for economic size, while the dependent variable also incorporates GNP. Again, this is a problem of a common term in the denominator of one measure and the numerator of the other. This point is applicable to our measures of investment dependence, private foreign investment as a percentage of GNP in 1967 and our dependent variable, CHANGEGNP.

Another related problem of measurement error is involved in the correlation of the measures of the dependent variable at 1965 and 1973. This violates the regression assumption that error terms are uncorrelated and results in an upward bias of the estimate of the autoregression and a downward bias of those independent variables which are positively correlated with the lagged dependent variables (Chase-Dunn, 1975:727). We will use the methodological literature on the issue as a basis for discussing possible biases, and return to the issue in the conclusion.

The controversy over the use of ratios in correlation or regression analyses has been extensively commented on in the literature since 1897. There are three generally recognized issues about how the use of ratios may lead to problems of inference, the first two of which are applicable to our analysis. First, if a theoretical argument is formulated in terms of a relationship between two variables, and these are correlated as ratios, say x/z and y/z, the shared component z may lead to spurious results. Second, studies frequently use standardized measures of the per capita form as a dependent variable and percent variables describing population characteristics as independent variables, to control for size of the economy. Third, the use of ratio variables to control for heteroskedasticity of unequal variances of the regression residuals may be problematic if the variances are not unequal to begin with.

a. Ratios as Variables of Theoretical Interest

Bollen and Ward (1979:435) suggest that taken by itself, there is no inherent problem with using a ratio or any other nonlinear combination of variables as an index. Difficulties of interpretation arise when the ratio is correlated with another ratio both of which share a component because the empirical test of the relationship between the concepts may be obscured. McNemar (1962:162) has referred to this index contamination as the problem of spurious index correlation. The common underlying assumption of research using ratio variables is that as long as the causal relationship holds between the ratios, one should not worry about spurious correlation. However widely accepted this view may be, it has certain difficulties.

One alternative is to reformulate the ratio estimates of y/z with x/z as y regressed on x and z; this will yield different regression coefficients. Rates are more difficult to reformulate in terms of a nonratio alternative, and may require a decomposition of the correlation between two ratio variables into the correlations and coefficients of variation of the variables that make up the ratios, as suggested by Schuessler (1973, 1974). Another check on the spuriousness of correlation between ratios is suggested by Logan (1972): a technique of part correlation that involves removing the effects of the common term from one ratio only. The correlation coefficients obtained can then be compared to the simple coefficient by correlating the two ratios. If significant coefficients are obtained with the part correlation control, one may conclude that the relation between the ratios is not spurious (Bollen and Ward, 1979:439). Fuguitt and Lieberson (1973) suggest that more work is necessary before Logan's approach is accepted as the unambiguous solution.

b. Ratios as Methods of Control

An alternative to standardization with a ratio is the use of residualizing techniques. Vanderbok (1977:182) suggests regressing the variables of interest on the deflating third variable and examining the relationship between the residuals. Instead of using the ratios y/z and x/z, the residuals from the regression of y on z (say, $e_{y.z}$) and x on z ($e_{x.x}$) are generated. The residuals $e_{y.z}$ and $e_{x.z}$ are uncorrelated with z and can be used as new variables in a second regression of $e_{y.z}$ on $e_{x.z}$. Although this residual approach seems intuitively appealing, rarely are the regression coefficients from the residual regression equal to those from the ratio regression (Schuessler, 1974:395). That is, y/z regressed on x/z does not equal $e_{y.z}$ regressed on $e_{x.z}$, and one may be significant and the other not. Moreover, the residual approach resembles the "component" approach that uses the regression of y on x and z, all in one step, so that the deflating variable (z) is entered as an additional explanatory variable (Bollen and Ward, 1979:441). Although the regression coefficient for x is exactly equal to the one for $e_{x.z}$, the standard errors used to evaluate the significance of the coefficients are likely to differ because of

(1) differences in explained variances, (2) differences in the variance of the explanatory variables, and (3) differences in the intercorrelation of explanatory variables. The R^2's will differ because a different dependent variable is used in each case, $e_{y.z}$ (smaller R^2) in the residual versus y in the component case. In fact, the residual regression correlation is equivalent to the partial correlation coefficient of y with x controlling for z ($r_{yx.z}$), and this partial is usually less than the multiple correlation coefficient of y on x and z.

An argument can be made that the estimated standard error for the residual approach is misleading since it represents a two-stage procedure and each stage involves sampling error. The component approach involves only one stage and may be more desirable (Bollen and Ward, 1979: 442-443). For example, if GNP per capita is used to control for the effects of population on GNP, the analysis can be reformulated to examine the effects of GNP controlling population as an additional explanatory variable. One potential problem is that if x and z are closely related, multicollinearity may make it difficult to assess accurately the separate effects of x and z on the dependent variable y. Bollen and Ward do not deal with the problem of multicollinearity in component regression analysis, although they do suggest that bringing in new data or dropping marginal variables from the analysis may be useful.

B. Measuring the Independent Variables[7]

1. Dependence on Foreign Investment

The operational definition of foreign direct investments used by the IMF and the OECD is:

> investment in a wholly-owned subsidiary or subsidiary-controlled firm in a foreign country or purchase of minority holdings in a foreign-based firm in which the investor takes a substantial interest in the day-to-day operations and the control of the object of investment (Hveem, 1975:59).

Direct investments represented 23.5% of total capital exports to underdeveloped countries by the DAC countries in 1970-71 (Hveem, 1975: 60). This percentage, however, does not reveal the real impact of investment because:

1. investments create a permanent productive structure that maximizes on-location control over the object of investment;

2. the investment is aimed at maximizing the accumulation capacity of the investor;

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[7] Data through 1973 for internal economic variables are from Arthur Banks, C. R. Granger, A. G. Lynm, *The Suny-Binghamton Cross-national Times Series Data Archive*. Data for 1975 on internal economic conditions and for all years for trade direction, composition, aid, capital flows and economic structure are from International Bank for Reconstruction and Development, *World Tables, 1976*, *World Bank Annual Report, 1972, 1975 & 1977*; International Monetary Fund, *Balance of Payments Yearbook*, various years, *International Financial Statistics*; United Nations, *Yearbook of International Trade Statistics*, *Yearbook of National Account Statistics*, *Statistical Yearbook* and *World Statistics in Brief*; United Nations A.I.D., *Population Program Assistance* (1971), *Proposed Foreign Aid Program FY1968* and *1967*; OECD, *Aid to Agriculture in Developing Countries*, *Development Assistance Efforts and Policies* (1965, 1970), *Geographic Distribution of Financial flows to less-developed countries* (1965, 1967); U.S. Dept. of State, *Background Notes*; U.N. Economic Commission for Africa, *Survey of Economic Conditions in Africa, 1972*, Part II; Helge Hveem, "The Extent and Type of Direct Foreign Investment in Africa," pp. 59-91 on Carl Widstrand (ed.) *Multinational Firms in Africa* (Uppsala: Scandinavian Institute of African Studies); Stockholm International Peace Research Institute, *World Armaments and Disarmament, SIPRI Yearbook 1977* (Cambridge, Mass.: MIT Press).

> 3. operations are increasingly financed from liquid assets rather than new investments;
>
> 4. accumulated stocks of investment renew the constant accumulation capacity and probably represent the source of the most important capital export.

(Hveem, 1975:60).

Ideally, then, we would like to construct a measure of the proprotion of a country's capital ownership that is controlled by foreign actors. Unfortunately, the data needed to measure the degree of foreign capital penetration are not available for most countries (Bornschier et al., 1978:660). Researchers have had to rely on adaptations of the stock of private foreign direct investment data originally reported in the 1972 OECD study, and these estimations only date back to 1967 (see Bornschier et al., 1978; Bornschier and Ballmer-Cao, 1979).

The degree of penetration can only be measured in very rough and approximate terms. Three alternative measures of stock of foreign investment are the number of subsidiaries of multinational corporations operating in each country (Bornschier, 1975); the amount of profit made by foreign controlled firms as indicated by the IMF Balance of Payments Yearbook item "debits on direct investment income" (chase-Dunn, 1975a; Rubinson, 1976; 1977; Szymanski, 1976); and the cumulation of yearly flows of foreign investment in five year sums that are combined with the 1967 OECD data (Stoneman, 1975).

In order to replicate the Bornschier et al. study as closely as possible, we will use the OECD data on private foreign investment, and calculate a measure of foreign private investment as a percentage of GNP.

2. Dependence on Foreign Aid

According to Paul Bairoch, the "more or less arbitrary way in which financial aid is defined obviously makes it hard to determine its precise volume" (1975:177). However, one is relatively safe in saying that apart from foreign grants narrowly defined, which are nonrepayable funds (basically gifts in cash or in kind) and destined for current or capital purposes. The bulk of aid consists of net flows of loans of over a year's duration (30% of total aid); investment and loans from the private sector (27% of total aid, approximately); and guaranteed export credits (about 12%). This leaves only about 30% of the total aid given to underdeveloped countries ad grants and grant-like contributions. (Bairoch, 1975:177). Bairoch also points out that whereas repayments of capital made by recipient countries are deducted from the amounts of net aid, this is not true of the interest charges on loans (1975:177-178). The problem is to determine the size of "real" aid as opposed to "flow of financial resources" to underdeveloped countries. T. Mende (1975) suggests that about 22-25% of the flow of resources can genuinely be called aid, and Bairoch agrees that this is a realistic estimate (1975:178).

Two principal agencies are responsible for the available data on flow of financial resources to underdeveloped countries: the United Nations/International Monetary Fund and the OECD "Material for both is based on questionnaires to donor countries and on estimates complementing these" (Bairoch, 1975:178). Because slightly different methods were used to construct the estimates, the two sets of figures differ; the OECD total being about one billion dollars higher than that of the UN one.

Bairoch suggests that the OECD figures are the more accurate because their estimate does not leave out transactions within certain monetary unions (1975:178).

Aid dependence is operationalized in the literature in terms of flows of public grants and loans to development projects, as indicated in current accounts in the IMF Balance of Payments Yearbook. Some researchers combine private and public flows of capital into a single measure of aid dependence (Kaufman et al., 1975) and others examine aid flows separately (Stoneman, 1975). We agree with the second approach, because as Stonmeman points out, the structural effects of direct investment clearly result from an increase in ownership and control over the recipient economy. Aid payments, on the other hand, are variable and rarely result in long-term direct economic control (1975:15).

In order to isolate those aid inflows suspected of increasing long-term direct economic control, we do not include private loans, export credits, direct investment and portfolio investment in our measure of net inflows of aid. Since only "official development assistance" (bilateral and multilateral institutions) is expressly intended for the economic and social development of developing countries and since the related financial terms are concessional (UN Statistical Yearbook, 1977:870), we measure the amount of aid from the Development Assistance Committee[8] (DAC aid) by total net flow of official bilateral and multilateral aid. The USSR and other bloc countries only offer official public aid, therefore this is the variable we use.

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[8] The Development Assistance Committee of the OECD included, in 1972, the sixteen western developed countries listed below: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Italy, Japan, Netherlands, Norway, Portugal, Sweden, Switzerland, U.K. and U.S. The GNP of these countries formed 98% of the total for all western developed countries (Bairoch, 1975:239).

3. Trade Measures

The relatively straightforward operationalization of measures of trade in the literature is reflected in our analysis. The trade variables are divided into two sets: variables that refer to identity of the trading partners and variables that describe the goods that are traded plus the amount of trade.

a. Trading Partner Composition

The four general trading partners identified in our equations are: the ex-metropole, other OECD countries, the USSR and other Eastern European countries, and the OPEC countries. All the partner-related variables examined are listed below, however, the data analysis reported in Chapter Four suggests that imports from the ex-metropole (VAR313) and imports from the Soviet bloc (VAR328) are the two relevant variables in the regression equation for growth.

Ex-metropole: VAR313 - the percentage of total imports supplied by the ex-metropole in 1965

VAR253 - percentage of exports to the ex-metropole in 1965

Other OECD Countries:

VAR264 - percentage of exports to other OECD countries in 1970

USSR and other East European Countries:

VAR328 - percentage of imports in 1965

OPEC Countries:

VAR273 - percentage of exports to OPEC in 1965

VAR333 - percentage of imports from OPEC in 1965

One point about the trade partner data that warrants mention is that it is customary to express exports in f.o.b. (free on board) prices and to express imports in c.i.f. (cost, insurance and freight) prices. In other words, export prices do not include freight costs, insurance and the other charges connected with transport (Bairoch, 1975:225). Even if the figures are corrected to take account of this difference, the cost of transport is not recovered by the underdeveloped countries whose foreign trade, for the most part, is carried by the merchant shipping of developed countries. Because we are not concerned with measuring balance of trade, however, this problem does not effect our actual analysis.

b. Composition and Amount of Trade

The discussion in the dependency literature of the effects of trade composition on economic growth have (with the exception of the early ECLA reports) emphasized the distortions related to composition of exports. Predictions of price fluctuations for primary products, decreased demand for raw materials, and unstable foreign exchange earnings have sent many analysts off on a search for indices of export commodity dependence. Apparently undisturbed by the failure of these various indicators of trade dependency to produce results consistent with dependency theory, researchers have tended to ignore the other component of trade composition dependency, composition of imports, and to conclude from their findings that dependency theory requires serious rethinking. In our analysis, we use both export and import variables.

The trade composition variables that appear in our equations are:

1. VAR344 - balance of trade: imports as a percentage of exports in 1970
2. VAR418 - machinery and equipment as a percentage of imports in 1970
3. VAR408 - raw materials and food as % total imports in 1970
4. VAR417 - machinery and equipment as % imports in 1965
5. VAR479 - imports as a % GDP in 1965

C. Transformations in the Independent Variables

Our general reference for the transformations used on the independent variables is E. Tukey's Exploratory Data Analysis (1978). One assumption underlying regression analysis, especially as it relates to tests of significance, is that the variables have multivariate normal distributions. Moreover, the least-squares regression technique is effected by the presence of extreme cases. To approximate the multivariate normal distribution, we excluded four outliers on the dependent variable (Ghana, Rwanda, Senegal and Uganda) because of the possibility that these extreme values are explained by a different causal mechanism. For the independent variables, we transformed according to the degree of skewedness: using logs on variables skewed to the right, square roots on variables skewed more extremely to the right, and cube roots on the most extremely skewed variables.

D. Control Variables

Because of the potential biases that could affect the relationships being studied, certain variables are controlled for spurious factors or to better specify the model (Bornschier et al., 1978:663). We have already discussed the large positive effect that initial level of development has on economic growth. In some of the regressions, we control for the effects of capital formation and/or domestic savings due to the fact that low levels of domestic capital formation may cause foreign capital to flow in and take up investment opportunities (Bornschier et al., 1978:663). Other studies that control for capital formation are Bornschier and Ballmer-Cao (1978), Chase-Dunn (1975a), Rubinson (1976), and Stoneman (1975).

1. Gross Domestic Capital Formation and Gross Domestic Savings

According to Stoneman, it is essential to include domestic savings as an independent variable because it is the single most important influence on growth (1975:13). One frequently used measure of domestic savings,

> "gross domestic capital formation, measures the outlays for the addition of reproducible capital goods to the fixed assets of private and public enterprises, private non-profit institutions, and general government and the value of the net increase, or decrease in inventories" (World Tables, 1976:7).

Rates of capital formation should, theoretically speaking, indicate the effort made by countries to achieve economic growth, however, several factors combine to reduce the value of this indicator. First, it is difficult to measure agricultural investment; second, the relative size of the collective effort may not indicate the degree of success (Bairoch, 1975:172).

Our preferred measure of level of domestic savings is gross national savings. This variable is defined as gross capital formation minus the current account deficit (excess of imports of goods and services or export of the same), and is a more conservative estimate of savings because it measures the amount of gross domestic capital formation financed from the nation's 'own' output. Savings are measured in 1970 and taken as a proportion of GDP (level of national income).

In addition to gross capital formation as a percentage of GDP in 1960 (VAR466) and domestic savings as a percentage of GDP in 1970 (VAR452), our analysis suggests that private foreign investment in 1967 (VAR467) may also be a contender for measuring level of domestic savings.

2. World System Position

The blockmodelling procedure used by Snyder and Kick to differentiate between positions in the world system (see Table 3-1 for the list of countries in each block) has two advantages over conventional (e.g. Sociometric) approaches to studying the form and operation of the social structure. First, it is a relatively flexible device for specifying similar patterns of interaction across multiple networks of interaction. In this way, blockmodelling resembles multi-dimensional scaling. The main advantage, however, is that blockmodelling provides a formal model of relationships among members of a population that can be used to deduce interesting properties of the system as a whole. Snyder and Kick use the blockmodel only as a clustering device, grouping together countries that have the same relationships or lack thereof to other countries.

In an attempt to move closer to a formal model of relationships between the periphery and the cose, we have subjected the block A/B distinction to relatively close scrutiny, to look for further differentiation within the African countries. The results are reported in Table 3-2. It should be noted by the reader that the four blocks, A_1,

TABLE 3-1

LISTING OF COUNTRIES IN EACH BLOCK: FOUR-NETWORK BLOCKMODEL
(Trade, Interventions, Diplomats, and Treaties)
FOR 118 NATIONS CIRCA 1965

Block	Nations
A	Chad, Congo (Brazzaville), Congo (Kinshasa), Uganda, Burundi, Rwanda, Somalia, Ethiopia, Malagasy Republic, Morocco, Algeria, Tunisia, Libya, Sudan, United Arab Republic,* Yemen*
B	Mali,* Mauritania,* Ghana,* Upper Volta," Senegal, Dahomey, Niger, Ivory Coast, Republic of Guinea, Liberia, Sierra Leone, Togo, Cameroun, Nigeria, Gabon, Central African Republic
C	Canada, United States, United Kingdon, Netherlands, Belgium, Luxembourg, France, Switzerland, Spain, Portugal, West Germany, Austria, Italy, Yugoslavia, Greece, Sweden, Norway, Denmark, South Africa, Japan, Australia
C'	Venezuela, Peru, Argentina, Uruguay, South Korea
D	Cuba, Ireland, East Germany, Hungary, Cyprus, Bulgaria, Rumania, USSR, Kenya, Iran, Turkey, Iraq, Lebanon, Jordan, Israel
D'	Finland, Saudi Arabia, Taiwan, India, Pakistan, Burma, Ceylon, Malaysia, Philippines
E	Panama, Colombia, Ecuador, Brazil, Bolivia, Paraguay, Chile, North Vietnam
E'	Haiti, Dominican Republic, Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica
F	Jamaica, Trinidad and Tobago, Poland, Czechoslovakia, Malta, China (People's Republic), Mongolian Republic, Nepal, Thailand, Cambodia, Laos, New Zealand, Iceland
F'	Albania, Syria, Kuwait, Afghanistan, North Korea, South Vietnam, Indonesia

*Starred countries in blocks A and B cluster together in further "splits" of the data, although they are not shown as separate blocks in Snyder and Kick's analysis (Snyder and Kick, 1979:1110).

TABLE 3-2

DIFFERENTIATION OF BLOCK A AND B COUNTRIES INTO REGIONS

Region	Nation	Geographic-Colonial Affiliation
B_1	Ghana	West Africa, Britain
	Mauritania, Mali, Upper Volta	former French West Africa
B_2	Senegal, Guinea, Dahomey, Ivory Coast, Niger, Cameroun, Togo	former French West Africa
	Central African Republic, Gabon	former French Equatorial Africa
	Ghana, Liberia, Nigeria, Sierra Leone	West Africa, U.S.A., Britain
A_1	Algeria, Libya, Egypt, Morocco, Tunisia	North Africa
	Ethiopia, Somalia, Sudan	Northeast Africa
	Malagasy Republic, Uganda, Kenya*	East Africa
	Chad, Congo (B)	French Equatorial Africa
	Rwanda, Burundi, Congo (L)	Central Africa
A_2 (missing from Snyder and Kick)	Angola, Mozambique	former Portuguese territories: Southern Africa
	South Africa, Namibia (S.W. Africa), Lesotho, Swaziland, Botswana	Southern Africa
	Malawi, Zambia, Rhodesia	Central Africa
	Tanzania	East Africa, Britain

Adapted from Africa: A Handbook to the Continent (1971:vii-viii), Colin Legum ed.

*Coded as a D country by Snyder and Kick.

A_2, B_1, and B_2 are closely associated with broad geographic divisions. The A_1 countries are north, east and northeast; the A_2 countries are mostly south and central African with Tanzania on the east-center border; the B_2 countries are located on the west-coast; and the B_1 countries are just to the interior of B_2.

Our general finding for twenty-eight African countries is that the B_2 countries differentiate themselves from the rest of Africa in terms of trade and the amount of multilateral aid received. (See Table 3-3 for the case list of variables that appear in the final model.) The 1965 measures of the variables correlated with position-dummy variables also show significant differences between the B_1, A_1, and A_2 regions as well. Looking at trade with the major partner, for example, 48.5% of total trade is accounted for in the B_2 countries. This is about 30% more than in the amount of trade with the major partner in the A_2 and B_1 countries and about 34% more than major partner trade in the A_1 group.

Exports to the ex-metropole as a percentage of total exports shows a consistent differentiation of B_2 countries. Fifty percent of B_2's total exports are destined for the ex-metropole as compared to 34% of A_2's, 29% of A_1's and 21% of B_1's. The percentage of imports from the ex-metropole yields a similar pattern with the B_2 countries importing 48.5% of their total, compared to 26% of A_2's, 34% of A_1's and 38% of B_1's.

The two slightly discrepant findings are related to the amount of trade with OECD countries other than the ex-metropole. B_1 differentiates itself in terms of exports, 51%, compared with 13% for B_2 and 25% for A_2

TABLE 3-3

DIFFERENTIATION OF CASE LIST BY BLOCKS

	% DAC Aid VAR348	% Imports from Ex-Metropole VAR313	% Imports from Soviet Bloc VAR328	% Raw Material and Food Imports VAR408	% Imports of Equipment & Machinery VAR418	C.D.F.C. VAR449	% Private Foreign Investment VAR469	% Change GNP
B_2								
Cameroun	9	58	1	19	32	10.2	1.9	51
C.A.R.	11	61	0	22	36	15.9	1.9	4
Benin	7	55	2	24	21	17.5	1.0	22
Gabon	42	58	0	26	39	39.2	14.7	32
Guinea	6	-1	-1	-0	-0	5.8	3.0	23
Ivory Coast	11	62	1	24	33	14.5	1.9	44
Liberia	10	47	0	22	34	13.5	12.5	34
Niger	9	53	0	22	27	9.2	0.8	7
Nigeria	2	31	2	22	37	10.8	2.1	10
Sierra Leone	4	33	4	29	26	7.3	1.8	52
Togo	9	31	3	32	22	11.7	2.1	48
B_1								
Upper Volta	5	54	0	31	27	7.9	0.6	4
Mauritania	11	47	0	29	38	37.5	6.5	25

Table 3-3 (continued)

Mali	5	24	22	39	21	10.7	0.2	48
A_1								
Burundi	5	-1	-1	35	20	6.2	1.0	32
Chad	7	46	1	26	23	11.3	0.7	15
Congo B.	23	61	1	17	33	52.7	7.2	26
Zaire	5	33	0	25	34	12.3	3.6	22
Ethiopia	2	18	4	19	35	11.6	0.3	17
Kenya	7	28	1	16	34	17.1	1.5	52
Somali	11	29	8	42	17	12.2	1.0	1
Sudan	1	23	10	29	27	11.9	0.2	24
A_2								
Botswana	24	-1	-1	-0	-0	8.4	0.4	35
Lesotho	13	-1	-1	34	14	2.0	0.1	8
Malawi	7	25	0	24	30	18.4	1.4	18
Tanzania	4	32	1	15	40	11.7	0.7	14
Zambia	5	20	0	17	39	23.8	3.6	52

(A_1 does not enter the equation); A_2 differentiates itself in terms of imports, 36%, compared with 17% for B_2 and 22% for A_1.

It is on the basis of these results that we have chosen to look for interaction terms between B_1, B_2, A_2 and A_1 and the main effects in the regressions. Given the collinearity of the main effect variables, we will consider only country position for interaction. It is legitimate for interaction terms to appear in the equation without the corresponding main effects, when one uses ratio variables or dichotomies both of which have real zeros. One interprets the interaction as strengthening or weakening the main effect. When the main effect is absent, the interaction means that the variable has an effect only in the countries that correspond to the dummy variable.

III. Analytical Strategies

Throughout our data analysis, we have followed a relatively straightforward procedure. First we look for main effects of untransformed independent variables on economic growth, then we see if transformations of the variables are important. Next, we search for interactions with the dummy variables for world system position. This procedure allows us to eliminate variables with insignificant effects; however, we run the risk of overlooking variables whose untransformed effects are not significant but could be if the variables were transformed. Again, our solution is the conservative one of elimination of untransformed variables from the equation.

The actual regressions were run by entering one variable at a time with the F-level set low (F=1), to take into account the possibility of suppressor effects. That is, we did not want to overlook pairs of variables that might not have a substantial effect when each is considered on its own, but have a strong effect when both are considered together. Because SPSS does not have backward selection as part of its stepwise regression routine, we performed additional runs in order to eliminate variables whose significance drops below conventional levels subsequent to the inclusion of additional variables.

IV. The Use of Interaction Terms

The use of interaction terms in multiple regression is a standard practice of econometricians (Johnston, 1972) and has been covered amply in recent papers by sociologists and political scientists (Allison, 1977; Hanushek and Jackson, 1977:106-108). Essentially, the procedure involves the inclusion in the regression equation of a variable (e.g., X_3) that is created by multiplying X_1 by X_2. Ordinarily, both X_1 and X_2 also are included in the equation, but this is not necessary when both are either ratio variables or dummy variables. Although X_3 is an exact (as opposed to probabilistic) function of X_1 and X_2, but since it is a non-linear function, the variance-covariance matrix of the independent variables is usually non-singular, although problems of multi-collinearity can occur.

Consider the equation below in which just X_1 and X_3 are included as independent variables:

$$(1)\quad Y = a + b_1X_1 + b_3X_3 + U$$

If we substitute the produce X_1X_2 for X_3, we get:

$$(2)\quad Y = a + b_1x_1 + b_3(X_1X_2) + U = a + (b_1 + b_3X_2)X_1 + U$$

As the re-expression of equation (2) shows, the unstandardized regression coefficient associated with X_3 can be interpreted as follows: when multiplied by X_2, it represents the component of the effect of X_1 on Y that is added (or subtracted from) the main effect of X_1 on Y for a given value of X_2. (The beta or standardized coefficients associated with the interaction terms are not interpretable.) When X_2 is a ratio variable, the inclusion of X_3 in the equation specifies that the effect of X_1 on the dependent variable is a linear function of X_2. When X_2 is a dichotomy, as is the case in all the analyses reported in this thesis, the inclusion of X_3 is less presumptious. In this case b_3 simply represents the difference between the slopes (unstandardized) of Y on X_1 when X_2 is present and when it is absent. Or, put another way, the slope of Y on X_1 is $b_1 + b_3$ when X_2 is present and just b_1 when X_2 is absent.

V. Conclusion

A final point that we would like to make in our discussion of methods is that the exercise carried out in this data analysis is one of "inductive reconstruction". Given the tenuous status of African data, about the most we can hope to accomplish is to confront a framework of ideas with a set of data in an attempt to contribute further to an understanding of the theoretical issues, with a constructive interaction between the two.

CHAPTER FOUR

PRELIMINARY FINDINGS FOR THE EFFECTS OF PRIVATE FOREIGN INVESTMENT AND AID ON GROWTH

I. Introduction

The analysis attempts to distinguish effects of foreign direct investment and aid on the growth of African economies. These are the direct and immediate effect on economic growth of inflows of capital (enabling higher investment and consumption) and the long term effects on growth that are attributed, in the literature, to delayed structural changes induced by the presence of foreign investment. The latter include export promotion, differential stimulus to various sectors, and changes in income distribution that are not conducive to economic development (Stoneman, 1975:11). We will assume that the findings of short term positive effects and long term negative effects can be considered as preliminary evidence in support of the world system argument.

The hypotheses that emerge from an exhaustive search for relationships among dependency variables (refer to the correlation matrix for the relationships finally considered) are listed below:

1. The greater the stock of private foreign investment, measured as a percentage of GNP in 1967, the less economic growth, as measured by change in GNP between 1965 and 1973.
2. The greater the stock of private foreign investment, measured by the proxy gross domestic capital formation as a percentage of GDP in 1960, the less the change in GNP between 1965 and 1973.
3. There exists an interaction between stock of private foreign investment and world system position that will increase the

negative effects on economic growth for those peripheral countries more closely integrated into the world economy, that is, the B_2 countries.

4. The greater the amount of short term private foreign investment, measured as the percentage change in private foreign investment from 1967 to 1973, the greater the change in GNP between 1965 and 1973.
5. Per capita aid from the Development Assistance Committee (DAC) is expected to behave in the same way as private foreign investment, however, DAC aid is measured in 1970, therefore we will test only for short term positive effects on change in GNP.

In addition, the investment and aid variables are combined to examine the effects of these variables on growth when both are included in the regression equation.

In the initial analyses, skewed variables were analyzed untransformed and with transformations. Because the transformations, made on the basis of univariate distributions of the variables, offer a better representation of the variables, only the results for the transformed versions of the variables are reported. With the exception of the lack of robustness for the negative effects of stock of foreign investment for the entire sample of twenty-seven African countries, the findings for the transformed set are quite similar to the findings for the untransformed set. In addition to the cumulative list of investment and aid variables, dummy variables are included in the regressions as measures of world system position.

II. Discussion and Interpretation of Findings

As suggested in the literature (Bornschier and Ballmer-Cao, 1978; Chase-Dunn, 1975a; Evans, 1972; Rubinson, 1977) prior level of development

(LGNP in 1965) has the strongest positive effect on economic growth (CHANGEGNP); the partial beta=.717 (see Table 4-1). The partial B is 22.152. The log of GNP in 1965 is an important control variable used to sort out the direction of causal effects. Bornschier et al. suggest that foreign investment or aid is attracted to countries with a relatively higher level of economic development because there are greater investment opportunities. "This mechanism would produce a positive relationship between level of economic development and foreign investment at any one point of time" (1978:663). That is, unless controlled, the results of this effect will confound the negative effect of foreign investment or aid on economic growth with the positive effect that level of growth has on attracting investment or aid (Bornschier and Ballmer-Cao, 1978; Chase-Dunn, 1975a; Evans, 1972; Rubinson, 1977).

Bornschier et al. (1978), Stoneman (1975) and Beckford (1971) also suggest that flows (short term effects) and stock (cumulative or long term effects) of foreign investment should be differentiated because they have opposite effects on economic growth. This pattern of findings holds for both investment and aid dependence (Bornschier et al., 1978:667).

The finding of a positive effect of the 1970 level of domestic savings on growth (the partial beta is .801 and the partial B is .822 for VAR452) illustrates the Bornschier et al. findings of short term positive effects of the availability of capital on economic growth, and is consistent with both the mainstream and Marxist-inspired literature. Because initial level of domestic savings is "an important cause of growth and low levels may cause foreign capital to flow in to take up

TABLE 4-1

THE EFFECTS OF PFI GROSS DOMESTIC CAPITAL FORMATION AND DOMESTIC SAVINGS ON GROWTH

```
DEPENDENT VARIABLE..     CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  1..    LGNP       LOG GNP PER CAPITA 1965
                                           NVAR449    SQUARE ROOT GROSS DOMESTIC CAPITAL FORMATION AS % GDP 1960
                                           IB2LV469   INTERACTION OF B2 WITH LOG PRIVATE FOREIGN INVESTMENT AS % GNP 1967
                                           NVAR466    CUBE ROOT % INCREASE IN PFI 1967-1973
                                           VAR452      DOM SAVINGS AS PERCENT GDP 1970

MULTIPLE R           0.65680      ANALYSIS OF VARIANCE     DF      SUM OF SQUARES      MEAN SQUARE          F          P
R SQUARE             0.43139      REGRESSION                5.        3068.84723        613.76945      3.18643    0.0270
ADJUSTED R SQUARE    0.29601      RESIDUAL                 21.        4045.02112        192.62005
STANDARD ERROR      13.87876

------------------ VARIABLES IN THE EQUATION ------------------        ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B            BETA     STD ERROR B       F         VARIABLE      BETA IN      PARTIAL    TOLERANCE          F

LGNP          22.15154        0.71719        8.57030     6.681        NVAR348      -0.15383     -0.09852      0.23325      0.196
NVAR449       -7.251045      -0.54167        3.24560     4.991        INNV348      -0.11847     -0.11172      0.50567      0.253
IB2LV469     -12.23779       -0.53851        5.82505     4.414
NVAR466        3.685056       0.36854        2.60418     2.002
VAR452         0.8221564      0.80143        0.35769     5.283
(CONSTANT)   -71.95515
```

investment opportunities" (Bornschier et al., 1978:663), we control for the initial level of gross domestic investment (NVAR449). Several studies that control for the effects of capital formation or domestic savings all those of Bornschier and Ballmer-Cao (1978), Chase-Dunn (1975a), Papanek (1973), Rubinson (1976), and Stoneman (1975).

Our use of gross national savings rather than gross domestic capital formation as our measure of domestic investment because it is a "cleaner" variable. Gross national savings (composed of gross public and gross private savings) shows the amount of gross domestic capital formation financed from the nation's output. Gross domestic savings is defined as the difference between gross domestic capital formation and the deficit on current account (World Tables, 1976:7). The deficit current account measures the excess of imports of goods and services over exports of goods and services. Including current account deficit in the measure of gross domestic capital formation allows one to control for such things as domestic capital outlay paid for factor services abroad, yielding a more conservative estimate of domestic capital outlay.

The short term effect of private foreign investment on growth is measured by the cube root of the percentage increase in private foreign investment between 1967 and 1973. This variable, NVAR466, has a positive effect on CHANGEGNP, as indicated by a partial beta of .368 and a partial B of 3.685. Again, this finding is consistent with Bornschier et al.'s results (1978:671), and the finding is substantiated in the literature. (See Kaufman et al., 1975; Papanek, 1973; Stoneman, 1975.) In fact, all four of the above findings are consistent with the findings of Bornschier et al. on the effects of foreign investment on growth. Short term changes in private foreign investment affect the economy in much the same way as domestic savings, by contributing to domestic capital formation (Pearson Commission Report, 1969).

On the surface, the finding of a negative effect of capital formation on growth (the partial beta of NVAR449 is -.542) appears to contradict our previous discussion of the positive effects of capital on growth, however, the problem is resolvable if gross domestic capital formation as a percentage of GDP in 1960 (NVAR449) is treated as a proxy for stock of foreign investment in 1960. We suggest that the short term positive effects of capital formation in 1960 have either dissipated by 1973 and/or are captured by LGNP. What remains is the long term negative effect of that portion of capital in 1960 that was formed by stock of private foreign investment. This interpretation is consistent with the findings of Chase-Dunn (1975b), Bornschier (1975), Bornschier and Ballmer-Cao (1978), Bornschier et al. (1978), and Stoneman (1975). In other words, NVAR449 is treated as a proxy for private foreign investment in 1960.

Support for this interpretation is provided by (a) the strong positive zero-order correlation between the square root of gross domestic capital formation in 1960 (NVAR449) and foreign private investment in 1967 (VAR469). The correlation is .632; (b) the fact that in the initial stepwise regressions (not reported), the magnitude of the effects of VAR469 drops as first IB2V449 and then VAR449 are added into the equation; and (c) the partial beta associated with the interaction between private foreign investment and the B_2 position in the world system (IB2V469) is positive. The failure to find a significant effect of the interaction between the transformed version of VAR449 and the B_2 position suggests that the effect of gross domestic capital formation is the same for all twenty-seven countries.

The log of VAR469 (the effect of private foreign investment as a percentage of GNP in 1967) is not significant, but the interaction between stock of private foreign investment and B_2 membership is (IB2L469). The partial beta is -.539, the partial B is -12.238. These results indicate that the negative effect of private foreign investment is limited to the B_2 countries; a finding consistent with the Bornschier et al. report of a stronger negative effect of direct foreign investment on growth for the richer underdeveloped countries.

In summary, with respect to the long term negative effects of stock of foreign direct investment on economic growth, if both NVAR449 and LVAR469 are accepted as measures of international variations in stock of foreign investment, we find a long term negative effect of private foreign investment for all twenty-seven countries, accompanied by an interaction term which indicates that the effect is stronger for the B_2 countries. Table 2 examines the effects of foreign aid on CHANGEGNP.

The short term effect of the level of per capita DAC aid measured in 1970 is negative. The partial beta of NVAR348 is -.502 and the partial B is -7.27. According to P. Jalee, this finding is related to the effectiveness of the capitalist aid coming in (1969:110). Harry Magdoff quotes Eugene R. Black, a former president and chair of the World Bank on the motives behind the Bank's foreign aid program. The three major benefits are: (1) substantial and immediate markets for

TABLE 4-2

THE EFFECTS OF DAC AID ON GROWTH

```
VARIABLE(S) ENTERED ON STEP NUMBER  3..    NVAR466    CUBE ROOT % INCREASE IN PFI 1967-73

MULTIPLE R           0.56726           ANALYSIS OF VARIANCE      DF       SUM OF SQUARES         MEAN SQUARE              F           P
R SQUARE             0.32178           REGRESSION                 3.          2289.09114           763.03038        3.63741    0.0278
ADJUSTED R SQUARE    0.23332           RESIDUAL                  23.          4824.77721           209.77292
STANDARD ERROR      14.48354

----------------- VARIABLES IN THE EQUATION ------------------          ------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE               B         BETA     STD ERROR B         F          VARIABLE       BETA IN       PARTIAL   TOLERANCE           F

LGNP            24.55294      0.79494       7.66270      10.267          NVAR449       -0.01819      -0.01513     0.46901       0.005
NVAR348        -7.271044     -0.50247       3.89298       3.488          IB2LV469      -0.18444      -0.16770     0.56069       0.637
NVAR466         2.180519      0.21807       2.17919       1.001          VAR452         0.27807       0.18559     0.30212       0.785
(CONSTANT)     -76.01545                                                 IANV348        0.02995       0.02823     0.60281       0.018
```

exports of goods and services, (2) stimulation of new overseas markets for the multinationals, and (3) the orientation of national economies toward a free enterprise system in which the multinationals can prosper (1969:176). Further analyses, however, indicate that the selfish motive may be too simplistic an explanation of the negative short term effect of DAC aid. None of the other aid variables were significant.

Finally, the combination of investment and aid variables (Table 4-3) yields an equation in which all effects are significant at conventional levels, and in which the R^2 and the R^2 adjusted are .437 and .268 respectively. With the exception of gross domestic savings (VAR452) which is measured in 1970, the variables entered on the first step of the regression are included on the grounds that they were measures in 1965. All of the variables left out of the equation are not significant, although the partial beta associated with the interaction of the A2 position with DAC aid (IMN348) is -.103. The variables accounting for the most variation in NVAR348, per capita DAC aid in 1970, are those associated with private foreign investment and gross capital formation as indicated in our final model. This association may be interpreted in two ways. First, in the context of Bornschier et al.'s findings, the negative effect of DAC aid on growth appears to be largely spurious. The other interpretation is that if NVAR348 (DAC aid) is entered first, the effects of NVAR449 (domestic capital formation) and IB2L469 (the interaction term for B2 and foreign private investment) on growth are indirect via their effects on DAC aid. The second interpretation is suggested by the final model in Chapter Six.

TABLE 4-3

THE EFFECTS OF PFI AND DAC AID (COMBINED) ON GROWTH

```
DEPENDENT VARIABLE..    CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  3..    NVAR449   SQUARE ROOT GDCF AS % GDP 1960

MULTIPLE R           0.66099           ANALYSIS OF VARIANCE     DF      SUM OF SQUARES        MEAN SQUARE             F           P
R SQUARE             0.43691           REGRESSION                6.         3108.11010          518.01835        2.58637     0.0509
ADJUSTED R SQUARE    0.26798           RESIDUAL                 20.         4005.75825          200.28791
STANDARD ERROR      14.15231

----------------- VARIABLES IN THE EQUATION ------------------          ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B             BETA      STD ERROR B         F          VARIABLE       BETA IN      PARTIAL   TOLERANCE          F

LGNP          23.97971          0.77638       9.66556        6.155          IA2NV348      -0.10951     -0.10331     0.50109        0.205
NVAR466        4.136427         0.41368       2.84447        2.115
VAR452        0.7398117         0.72116       0.40942        3.265
NVAR348       -2.225963        -0.15383       5.02753        0.196
IB2LV469      -11.14544        -0.49045       6.43187        3.003
NVAR449       -6.003846        -0.44850       4.34605        1.908
(CONSTANT)    -79.89969
```

The findings for the effects of private foreign investment on the economic growth of twenty-seven African countries support the world system/dependency distinction between short term positive effects of private foreign investment on growth and long term negative effects of stocks. The negative effects of gross domestic capital formation on growth is resolved within the world system framework by treating capital formation measured in 1960 as a proxy for direct foreign investment in that year. The interaction between the negative effect of stock of private foreign investment with the B2 position in the world system is consistent with Bornschier et al.'s finding of a stronger negative effect of direct foreign investment for the growth of richer underdeveloped countries. The preliminary analysis also reveals a negative short term effect of aid that was not anticipated by Bornschier et al. In the context of their findings, this effect could be interpreted as spurious. However, the final model indicates that capital formation and the interaction between foreign investment and the B2 countries affect growth indirectly, via their effects on DAC aid.

CHAPTER FIVE

PRELIMINARY FINDINGS FOR THE EFFECTS OF TRADE ON ECONOMIC GROWTH

I. Introduction

The effects of trade on economic growth are less straightforward for a number of reasons. First, unlike the effects of foreign investment and aid, the previous research on trade provides no clear guidelines for the construction of an initial model. Consequently, our reduction of all possible trade variables down to a manageable set that could be tested in conjunction with position in the world system proceeded in a more ad hoc fashion. Second, this ad hoc procedure was hampered by the fact that some of the countries have missing values on some of the trade variables. These missing values generally reduced the number of cases analyzed and created further problems in that with listwise deletion, the inclusion or exclusion of a given variable changed the composition of the data set slightly. Third, a number of independent variables that appeared to affect growth were badly skewed, and when transformed versions of these variables were used, some of these variables no longer appeared to affect growth.

In order to obtain a relatively small set of independent variables, the results obtained with the transformed set is regarded as representing the main effects of the trade variables. Finally, because of the large number of trade variables that were found to interact with the country's position in the world system, the final analyses of the trade variables on the B_2 and non-B_2 countries were run separately.

Although this procedure seems preferable on theoretical grounds, it does reduce the statistical power of the analyses. With these caveats in mind, we present the results of our analyses of the effects of trade on growth.

In the analyses of the trade variables, the trade variables were divided into two sets and, initially, analyzed separately. The first set consists of those variables that refer to the identity of the trading partners; the second set consists of those variables that describe the goods that are traded plus the amount of trade. We begin our discussion with the findings on trading partners. The chapter ends with a discussion of the results of analyses that examined both sets of variables together.

II. Discussion of Findings and Initial Interpretation of Trade Effects

The initial regressions of change in GNP on untransformed and transformed measures of imports and exports from the USSR and other East European countries, OPEC, the ex-metropole and other OECD countries suggest that first, trade dependence is a function of imports rather than exports, and second, it is related to the origin of the imports (see Table 5-1). For the transformed set, initial level of development, LGNP 1965, has (as expected) the strongest positive effect on growth, with a partial beta of .638. The finding of a negative effect of the percentage of imports from the ex-metropole in 1965 (VAR313) (beta= -.342, B=-.395) is consistent with the dependencia version of dependency theory (see Osvaldo Sunkel, 1971, translated in part in Tyler and Wogart, 1973:37), with Vengroff's (1977) analysis (see Table 2, page 621 in Vengroff) and with the ECLA analysis of center-periphery trade

TABLE 5-1

THE EFFECTS PF TRADE PARTNER VARIABLES ON GROWTH

```
DEPENDENT VARIABLE..     CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  1..    LGNP      LOG GNP PER CAPITA 1965
                                           VAR313     PERCENT IMPORTS FROM EXMETROPOLE 1965
                                           NVAR328   SQUARE ROOT PERCENT IMPORTS FROM USSR AND OTHER EAST EUROPEAN COUNTRIES
                                           A1        DUMMY VARIABLE FOR POSITION A1                                       1965

MULTIPLE R             0.73932       ANALYSIS OF VARIANCE      DF      SUM OF SQUARES      MEAN SQUARE           F          P
R SQUARE               0.54659       REGRESSION                 4.       3629.75740         907.43935        5.42477    0.0048
ADJUSTED R SQUARE      0.44583       RESIDUAL                  18.       3010.98688         167.27705
STANDARD ERROR        12.93356

---------------- VARIABLES IN THE EQUATION -----------------         ------------- VARIABLES NOT IN THE EQUATION --------------

VARIABLE             B            BETA      STD ERROR B        F         VARIABLE      BETA IN      PARTIAL    TOLERANCE          F

LGNP           19.90808        0.63816        5.48560     13.171         NVAR273      -0.14618     -0.17287      0.63411      0.524
VAR313         -0.3954611     -0.34237        0.21964      3.242         NVAR333      -0.02840     -0.04038      0.91632      0.028
NVAR328         4.083923       0.28919        2.58486      2.496         VAR253        0.03939      0.05554      0.90119      0.053
A1            -13.22202       -0.34168        6.50981      4.125         VAR264        0.16372      0.20777      0.73028      0.767
(CONSTANT)    -51.52247                                                  B2           -0.09733     -0.10318      0.50957      0.183
                                                                         A2            0.11933      0.12375      0.48767      0.264
                                                                         B1            0.00941      0.01248      0.79805      0.003
```

relations (see R. Prebisch, 1962).

Coupled with the negative effect of imports from the ex-metropole, the ideological significance of a positive effect of imports from the Soviet Union and other East European countries (NVAR328) (beta=.289, B=4.084) is obvious. At this point in our analysis, however, we will only suggest that the finding may be related to the Soviet stance on aid. Jalee compares Soviet and French bilateral public aid (there is no Soviet private aid) to illustrate the difference in the percentage of aid devoted to industrialization. The amount of French aid from the FAC (Fund for Aid and Cooperation) directed towards industrialization in West Africa amounted to only 0.15% of French total aid between 1959 and 1962; the comparable percentage for Soviet aid was about 50% (1969: 110). Although these figures may be somewhat of a caricature, they do point to what may be a difference between the sectoral destiny of incoming funds. For example, Soviet imports are, for the most part, composed of heavy machinery, and therefore likely to contribute to the domestic industrial base. We will take up this discussion when we interpret our final model.

The presence of the dummy variable A_1, with a partial B of -13.222 suggests that this group of countries would have growth rates averaging about 13% less than the other groups if the values of all countries on the other independent variables could be held constant in the equation. That is, other things being equal, the A_1 countries have achieved less growth than the other three sets (B_1, B_2, and A_2). This result, however, is explained in later analyses as stemming from the fact that the positive effect of imports from the USSR is substantially less for the A_1 countries.

As a final note on the effects of trading partner composition on growth, the negative effect of VAR313 (% imports from ex-metropole in 1965) is unaffected by either the exclusion of the variables discussed above or the inclusion of A_1.

III. Discussion of the Findings on the Interaction of Trade Partner Variables with Position in the World System

This set includes the transformed versions of VAR273, VAR328, and VAR333, plus the variables whose main effects were significant in the first run: LGNP, VAR313 (% imports from the ex-metropole, 1965), dummy variable A_1, and NVAR328 (square root, % imports from the Eastern bloc). The interaction terms were created by multiplying VAR313 and NVAR328 times the dummy variables A_1, B_1, B_2, and A_2.

The main effects of LGNP, VAR313, B_2 and NVAR328 were all entered on step one. The interaction terms were then allowed to enter one at a time, according to standard stepwise regression procedures. With the F-value set to one, the inclusion of interaction terms involving NVAR328 resulted in an attenuation of the effect of A_1 consequently; a second stepwise regression was run (see Table 5-2).

The variables entered on the first step of the second run replicate those entered on the first run, with the exception of A_1. These variables are described below. Next, the remaining variables were allowed to enter on subsequent levels, however, these variables did not have F-values that exceeded the specified level of 1.0. Nevertheless, an interaction between VAR313 and B_2 was a serious contender for inclusion in the final equation. If IB2VAR313 had been included, the partial beta would have been 0.532. The partial correlation associated with

TABLE 5-2

THE EFFECTS OF THE INTERACTION OF TRADE PARTNER VARIABLES WITH WORLD SYSTEM POSITION ON GROWTH

```
DEPENDENT VARIABLE..   CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  1..   LGNP       LOG GROSS NATIONAL PRODUCT PER CAPITA 1965
                                          VAR313      PERCENT IMPORTS FROM EXMETROPOLE 1965
                                          NVAR328    SQUARE ROOT PERCENT IMPORTS FROM USSR AND OTHER
                                          IB1NV328   INTERACTION TERM FOR SOVIET IMPORTS AND POSITION B1
                                          IA1NV328   INTERACTION TERM FOR SOVIET IMPORTS AND POSITION A1
                                          B2         DUMMY VARIABLE FOR POSITION B2

MULTIPLE R           0.85516      ANALYSIS OF VARIANCE    DF     SUM OF SQUARES      MEAN SQUARE           F          P
R SQUARE             0.73130      REGRESSION               6.       4856.40798        809.40133       7.25784     0.0007
ADJUSTED R SQUARE    0.63054      RESIDUAL                16.       1784.33630        111.52102
STANDARD ERROR      10.56035

---------------- VARIABLES IN THE EQUATION -----------------       ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B            BETA     STD ERROR B       F      VARIABLE      BETA IN     PARTIAL    TOLERANCE        F

LGNP           23.26965       0.74592       4.71111    24.397      IB2V313       0.53177     0.22094     0.04638     0.770
VAR313        -0.2943898     -0.25487       0.20377     2.087      IB1V313      -0.00997    -0.01650     0.73586     0.004
NVAR328        14.55015       1.03032       4.55023    10.225      IANV313       0.00009     0.00015     0.67587     0.000
IB1NV328      -9.376631      -0.52783       4.72079     3.945      IA2V313      -0.07030    -0.08818     0.42271     0.118
IA1NV328      -17.74028      -0.96526       4.65494    14.524      IB2NV328      0.25376     0.16900     0.11917     0.441
B2            -11.22507      -0.32748       7.03358     2.547      IA2NV328     -0.10946    -0.16900     0.64046     0.441
(CONSTANT)    -71.83271                                            A2           -0.06433    -0.07719     0.38690     0.090
                                                                   A1            0.07030     0.07378     0.29596     0.082
                                                                   B1            0.00190     0.00250     0.46494     0.000
```

this coefficient is high (0.221), but the tolerance is low, and, of course, the F-value is less than 1.0. The R^2 and R^2 adjusted for the equation are 0.731 and 0.631 respectively. The F-value equals 7.258, which for 6 and 16 degrees of freedom is significant beyond the .01 level. All coefficients are significant at the .10 level, and most are significant at the .05 level.

As suggested by the previous results, LGNP has a substantial effect on economic growth. The betas and B's associated with VAR313 (% imports from ex-metropole in 1965) fluctuated widely as different variables entered the equation, and the F-value associated with this coefficient is the smallest, F=2.087. Nevertheless, the partial B is fairly close to the partial B's of the previous runs as is its value when it first enters the equation after LGNP. On these grounds we will include VAR313 in the equation.

A partial beta of greater than one associated with NVAR328 (square root, % imports from Eastern bloc) arises mainly because of the inclusion of the main effect of B_2. The negative coefficient associated with IAN328 is sufficiently large so that for the A_1 countries, the effect of imports from Eastern bloc countries is negative (partial B= -17.74, partial beta=-.965). Finally, other things being equal, the B_2 countries grew less than other African countries.

In explaining the negative effect of the interaction of Eastern bloc imports with world-system positions B_1 and A_1, one should keep in mind that the Soviet aid and trade relations have always been re-enforced by those of the East European Communist states (Klinghoffer, 1974:66), therefore, the Eastern bloc policies are basically Soviet policies. The interaction could reflect policy differences towards Asian countries that roughly correspond to geographic grouping. For example, the nine African states with which the Soviet Union does not maintain diplomatic relations fall into positions B_2 (Liberia, Ivory Coast, Gabon, Niger) and A_2 (South African Republic, Lesotho, Swaziland, Botswana, Malawi) exclusively. Or, the interaction could reflect the relative ability of different African countries to avoid the problems of dependence on the Soviet bloc. This second suggestion is rather speculative given the small proportion of Soviet Union-African trade (2% of the USSR's total and 4% of Africa's, 1970)[9] however, in relations with its major African trading partners, Algeria, Sudan, Morocco (A_1 position countries), Ghana (B_1), and Nigeria (B_2), the Soviets maintain only a slightly favorable trade balance, with deficits in trade with Nigeria and Ghana (Klinghoffer, 1974:68).

A third possible interpretation of the interaction is in terms of a curvilinear relationship. Specifically, the positive effect of NVAR328 (transformed % imports from Eastern bloc) is greater for lower values of the variable. This explanation is supported by the zero order correlations of NVAR328 with the dummy variables measuring position in the world-system. Listing the African blocks from high to low, the percentage of imports from the Soviet Union and other Eastern countries is highest in A_1, followed by B_1, B_2 and A_2.

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[9] U.S. Department of State, Bureau of Intelligence and Research, Communist States and Developing Countries: Aid and Trade in 1970, 92nd Cong., 1st Session, Sept. 22, 1971. Percentage estimated by Klinghoffer, 1974:67.

To summarize the results of these initial runs, there appears to be a difference between the effects of imports from the ex-metropole and imports from the Soviet Union and other East Suropean countries. Whether or not the trade variables are transformed, imports from the ex-metropole have a strong, consistent negative effect on growth for all African regions. The positive effect of imports from the Soviet Union, explained in terms of composition or effectiveness of imports, is, on the other hand, overridden in the transformed set by the negative coefficient associated with the interaction of these imports with the dummy variable for A_1. This interaction could reflect regional policy differences, differential ability to avoid dependence on the Soviet bloc, or a curvilinear relationship where the positive effect of NVAR328 is greater for smaller values of the variable. We will return to this interaction in our analysis of the combined trade partner/trade composition set.

IV. Discussion of Findings for the Combined Set of Trade Partner and Trade Composition Variables

The partner and composition variables with significant main effects in the previous runs were combined into a single set; LGNP and the trade partner variables were entered on the first step of the regression (not reported); the composition variables and dummy A_1 were entered on the second step. With the exception of A_1, the effects of all the variables entered on the first step went to zero. The effect of the trade-composition variables and $A1$ are all statistically significant and large therefore rather than attempting to introduce the associated interaction terms at this point, we divided the countries into B_2 and non-B_2 groups.

V. Analysis for the B_2 Countries

The findings for the ten B_2 countries are generally interpretable from the world system perspective. (Refer to Table 5-3.) As expected, LGNP in 1965 has the strongest effect on growth. The other variable which appears to effect growth positively is NVAR328, the transformed version of percentage imports from the USSR and other Eastern bloc countries. The partial beta is .680. The correspondence between relatively high levels of initial development for the B_2 countries and low percentages of Eastern bloc imports may put the B_2 countries in a better position to benefit from this trade concentration in industrial-imports. On the other hand, the negative effects of VAR418 (machinery and equipment imports), beta=-.908, and NVAR408 (food and raw materials), beta=-.812, reflect the bulk of B_2 trade (refer to correlation matrix, appendix to Chapter Five); that is, trade with the ex-metropoles and other OECD countries. In the context of the dependency literature one would expect these imports to have more profound, negative effects on growth via misplaced emphasis away from the domestic production of goods necessary to build and maintain a sound economic infrastructure. However, the difference between our findings and the dependency/dependencia predictions is that the literature emphasizes the negative effects of export rather than import-composition. One may resolve the difference rather indirectly by drawing the connection between those distortions produced in the indigenous economic infrastructure and the distortion-related demand created to maintain the export-industry. That is, import-composition is an indicator of internal economic problems that may be related, in part, to export-specialization.

TABLE 5-3

THE COMBINED TRADE PARTNER AND TRADE COMPOSITION EFFECTS ON GROWTH FOR THE TEN B2 COUNTRIES

```
DEPENDENT VARIABLE..    CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  1..   LGNP       LOG GNP PER CAPITA 1965
                                          VAR313     PERCENT IMPORTS FROM EXMETROPOLE 1965
                                          NVAR328    SQUARE ROOT USSR AND OTHER AS PERCENT IMPORTS 1965
                                          VAR418     MACHY & EQUIP AS PERCENT IMPORTS 1970
                                          NVAR408    LOG FOOD AND RAW MATERIALS AS PERCENT IMPORTS 1970

MULTIPLE R             0.92900      ANALYSIS OF VARIANCE    DF      SUM OF SQUARES      MEAN SQUARE          F          P
R SQUARE               0.86304      REGRESSION               5.         2678.62643        535.72529     5.04133     0.0711
ADJUSTED R SQUARE      0.69185      RESIDUAL                 4.          425.06648        106.26662
STANDARD ERROR        10.30857

----------------- VARIABLES IN THE EQUATION ------------------       ------------ VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B           BETA      STD ERROR B       F         VARIABLE     BETA IN      PARTIAL   TOLERANCE         F

LGNP          46.50829        1.46071       12.18069    14.579        VAR479      -0.08583     -0.10765     0.21544      0.035
VAR313        -0.7327807     -0.49825        0.50628     2.095
NVAR328       15.90912        0.68009        6.52668     5.942
VAR418        -2.666270      -0.90819        1.08778     6.008
NVAR408      -98.82843       -0.81250       46.73239     4.472
(CONSTANT)   217.6514
```

In this context, the ECLA analysis is relevant, although their policy was formulated as if imports were the motor behind Latin America's economic problems. We suggest that the imports were one of many symptoms.

Finally, VAR418 (machinery and equipment imports) and NVAR408 (log of food and raw material imports) are negatively correlated (r= -.461). In part, this negative correlation results from the fact that both variables express the amount of a particular type of goods imported as a percentage of total imports. Other things being equal, therefore, the higher the percentage of one type of imports, the lower the percentage of the other type. The methodological significance of this negative correlation is that is makes no sense to combine NVAR408 and VAR418 into a single index. Also, combining these variables assumes that NVAR408 and VAR418 have the same partial slope (effect in growth). This is clearly not the case.

VI. Analysis for the Non-B_2 Countries

Because the effects of the trade partner variables vanish upon inclusion of the trade-composition variables, two runs were made for the thirteen non-B_2 countries. (The first run, Table 5-4, includes all of the trade partner variables measured at 1965; the second run, Table 5-5, includes the trade composition variables, most of which are measured at 1970.) The R^2 for the regression equation produced on the first run is .858. The R^2 adjusted is .787. The F-value is 12.10, which for 4 and 18 degrees of freedom is significant beyond the .01 level. All coefficients in the equation are significant at the .025 level.

TABLE 5-4

THE TRADE PARTNER EFFECTS ON GROWTH FOR THE THIRTEEN NON-B2 COUNTRIES

```
DEPENDENT VARIABLE..    CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  1..    LGNP       LOG GNP PER CAPITA 1965
                                           VAR313     PERCENT IMPORTS FROM EXMETROPOLE 1965
                                           NVAR328    SQUARE ROOT SOVIET AND OTHER AS PERCENT IMPORTS 1965
                                           IA1NV328   INTERACTION TERM FOR SOVIET AND OTHER IMPORTS WITH POSITION A1

MULTIPLE R           0.92636        ANALYSIS OF VARIANCE    DF     SUM OF SQUARES      MEAN SQUARE          F          P
R SQUARE             0.85815        REGRESSION               4.        2864.10976        716.02744     12.09942   0.0018
ADJUSTED R SQUARE    0.78723        RESIDUAL                 8.         473.42920         59.17865
STANDARD ERROR       7.69277

----------------- VARIABLES IN THE EQUATION ------------------       ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B           BETA     STD ERROR B         F       VARIABLE      BETA IN     PARTIAL   TOLERANCE          F

LGNP          24.31933        0.67163        4.85829     25.057      NVAR344      -0.02139    -0.02688     0.22385      0.005
VAR313      -0.4861916       -0.40023        0.17564      7.663      VAR418       -0.05279    -0.08977     0.41021      0.057
NVAR328       4.364455        0.38960        1.87513      5.417      NVAR408      -0.07550    -0.15506     0.59825      0.172
IA1NV328     -9.143134       -0.63939        2.25658     16.417      VAR479        0.20450     0.49892     0.84430      2.320
(CONSTANT)   -66.98030                                               A1            0.05995     0.09832     0.38151      0.068
```

TABLE 5-5

THE TRADE COMPOSITION EFFECTS ON GROWTH FOR THE THIRTEEN NON-B2 COUNTRIES

```
DEPENDENT VARIABLE..    CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  1..    A1        DUMMY VARIABLE FOR POSITION A1
                                           NVAR344   LOG BALANCE OF TRADE 1970
                                           VAR418    MACHY & EQUIP AS PERCENT IMPORTS 1970
                                           VAR479    IMPORT AS % GDP 1960

MULTIPLE R           0.92940        ANALYSIS OF VARIANCE    DF      SUM OF SQUARES      MEAN SQUARE          F          P
R SQUARE             0.86378        REGRESSION               4.         2882.89655        720.72414      12.68204    0.0015
ADJUSTED R SQUARE    0.79567        RESIDUAL                 8.          454.64241         56.83030
STANDARD ERROR       7.53859

---------------- VARIABLES IN THE EQUATION -----------------         ------------ VARIABLES NOT IN THE EQUATION ------------

VARIABLE             B           BETA     STD ERROR B        F       VARIABLE     BETA IN     PARTIAL   TOLERANCE        F

A1            -16.17480      -0.50324       4.62724     12.219
NVAR344       -56.20730      -0.93234       9.55342     34.615
VAR418       -0.7256731      -0.31354       0.38720      3.513
VAR479        0.4592464       0.35992       0.17011      7.289
(CONSTANT)     306.2630
```

The positive effect of LGNP, partial beta=.672, and the negative effect of VAR313, partial beta -.400 (% imports from the ex-metropole) are both readily interpretable in the context of both theoretical and empirical literature reviewed in the first two chapters. The interesting finding, of course, is the strong negative effects of IA1NVAR328 (interaction of A_1 with square root of imports from the USSR and other Eastern European countries; the partial B=-9.14, the partial beta=-.639, for the A_1 countries. This interaction means that the effects of Soviet bloc imports from the A_1 countries is -4.79. We interpret these results in the following way: In the case of the B_1 and A_2 countries (where the percentage of imports from the Eastern bloc countries is low), imports from the Soviet bloc may represent a diversification of trading partners away from ex-metropole dependence that avoids dependence on the Soviet Union. On the other hand, the A_1 countries have a greater proportion of Soviet imports, and show signs of trade dependence, that is, the negative effect of Soviet bloc imports on growth.

The same argument could be applied to the moderate amount of trade in the case of the B_1 countries. Indeed, as in the analysis of the trade partner variables for the entire sample, a negative effect of the interaction between B_1 and NVAR328 is found in the analysis of the non-B_2 countries (not reported). This interaction is not statistically significant, however, in part because of the small number of B_1 countries in the analysis.

The general results for the second run are an R^2 and R^2 adjusted of .864 and .796 respectively. The F-value for the equation is 12.862, which at 4 and 8 degrees of freedom is significant beyond the .01 level.

All coefficients in the equation are significant at the .05 level (one-tailed). The variables includes in the equation are NVAR344 (log of balance of trade in 1970) with a partial B of -56.207 and a partial beta of -.932, VAR418 (machinery and equipment as % imports in 1970) with a partial beta of -.314 and a partial B of -.726, (the magnitude of this coefficient is substantially less than for the B_2 countries), VAR479 (imports as a % GDP in 1965) with a partial beta of .360 and a partial B of .459, and finally, A_1 with a partial beta=-.503 and a partial B=-16.17.

From the standpoint of dependency theory, the question that the negative effect of a surplus of imports to ecports raises is the extent to which a trade deficit is a consequence of either a country's trade dependence and/or its dependence on other countries for the formation of capital. The negative effect of imports of machinery and equipment as a percentage of imports can be given the same interpretation as was offered in the discussion of the B_2 countries (see discussion of Table 5-2). The negative effect of A_1 means that, other things being equal, the economic growth of the B_2 countries lagged behind that of the non-B_2 countries. If, as we have suggested, the A_1 countries constitute the extreme periphery of the modern world system, then this finding is consistent with the world system/dependency perspective.

Our interpretation also rests on the assumption that the M countries (missing from Snyder and Kick) are not (for various reasons) subject to the constraints of typical dependency relations arising from a particular form of economic incorporation into the world system.

In conclusion, the results for the B_2 countries are clearly more easily interpreted from the world system/dependency perspective. Both trade-partner variables such as imports from the ex-metropole and trade-composition variables such as imports of machinery and equipment have significant negative effects in the case of the B_2 countries. The main exception to this pattern is the positive effect on growth of imports from Eastern bloc countries and the Soviet Union, but interpreting this finding also poses a problem of interpreting the negative side of this variable for the A countries. The only dependencia-inspired trade composition variable that appears in the equation for the non-B_2 countries is machinery and equipment as a percentage of imports, and this variable has the smallest beta. The results for the second run (not reported) for the non-B_2 countries indicate that the effect of the trade partner variables wash out when the trade composition variables are introduced. The implication of this finding is that in order to interpret the effects of trade partner variables, we need to know their effect on the trade composition variables.

The interpretation difficulties raised by the analyses of the trade variables, particularly in the case of the non-B_2 countries, leads us into Chapter Six, our final data analysis chapter, in which we will examine the trade variables in the context of the effect of foreign private investment on growth. This analysis will cumulate in our final model of how market and economic power dependency effect the economic growth of African countries.

CHAPTER SIX

PRESENTATION OF THE STRUCTURAL AND REDUCED-FORM EQUATIONS FOR THE FINAL MODEL OF THE COMBINED EFFECTS OF MARKET AND CAPITAL DEPENDENCY ON ECONOMIC GROWTH

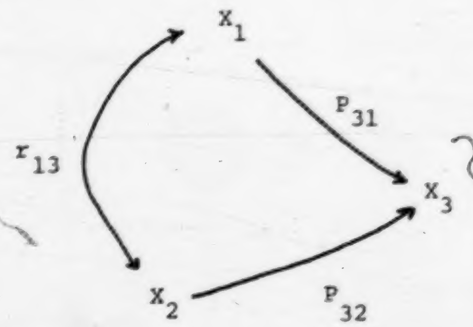
Chapter Six integrates the findings presented in Chapters Four and Five into a single model of market and capital dependency for Africa. For this reason, a brief summary of the previous data analysis will be given in the introduction. Chapter Four is an analysis of the effects of aid and private foreign investment on growth. Of the many aid variables tried, only the percentage of DAC aid has an effect on growth, and this effect is negative. There also appeared to be a positive interaction of DAC aid with position A_2, however, the final model indicates that the interaction is negative. Gross domestic capital formation also had a negative effect on growth that was strengthened in the case of the B_2 countries. Although foreign direct investment had no main effect on growth, its interaction with the B_2 variable was significant and negative. It was suggested that most of the variation in gross domestic capital formation reflects differences in private foreign investment or foreign controlled investment. In addition, internally-generated but foreign-controlled outlays of capital measured in 1960 provide a better measure of long term foreign investment than does the investment variable measured in 1967. Consequently, gross domestic capital formation is the preferred measure of foreign investment. Rather than interpreting the interaction between B_2 and foreign investment as a stronger negative effect in the case of richer peripheral countries, (in fact, in the case of capital formation, the B_2 countries are not richer) as do Bornschier et al. (1979), the B_2 position is regarded as more integrated into the world economy than other African regions.

The more integrated a country, the more likely it is to be dependent and to exhibit the negative effects of its dependence. Chapter Four provides preliminary support for this statement as indicated in the results of combining the aid and investment variables into one regression equation. DAC aid is highly correlated with both measures of private foreign investment. This suggests the possibility of a constellation of variables that are related to the connection of peripheral countries to the core, and the effects of these variables are negative.

Chapter Five did not present a specific model, rather the trade variables that remained after a careful process of elimination were divided into two groups (1) trade partner, and (2) trade composition. The trade partner variables that emerged were the percentage of imports from the ex-metropole with a negative effect on growth, and the percentage of imports from the Soviet Union and other East European countries with a positive effect. The negative interaction between the A_1 countries and Soviet imports, however, may reflect a curvilinear relationship. That is, the main effect and the interaction effect cancel one another out. Therefore, to the extent that the interaction is substantially larger than the main effect, the effect of trade with the Soviet bloc will be negative. Of the trade composition variables, the percentage of raw material and food imported had a negative effect on growth that was strengthened by an interaction with the B_2 countries. Machinery and equipment imported also had a negative effect. Finally, in an attempt to integrate the above findings into a more coherent picture of African dependency, the aid, investment and trade variables were combined into a single model, as described below.

Because much of the discussion of the final model will be couched in terms of the components of the correlations, a brief explanation of direct, indirect, main and interaction effects is in order. Kerlinger and Pedhazur suggest that "within a given causel model it is possible to determine what part of a correlation between two variables is due to the direct effect of a cause and what part is due to indirect effects" (1973:314). Indirect effects may occur via two correlated causes, X_1 and X_2, that have direct effects on the dependent variable, X_3, in addition to an indirect effect through the correlations with other causes. This is illustrated in figure 6-1.

Figure 6-1



In this case, X_1 and X_2 are exogenous variables. In this case, the correlation r_{13} is due to the direct effect of X_1 on X_3 (P_{31}) and the indirect effect due to the correlation of X_1 and X_2 which is also a cause of X_3. The same reasoning applies to r_{23}. (For more examples of decomposition see Kerlinger and Pedhazur, 1973:314-316.)

A correlation may also be decomposed into a direct effect and total indirect effects, making it possible to study the magnitude of each of these components and discern the roles they play in the system. "To obtain the total indirect effects of a variable all that is necessary is to subtract its direct effect from the correlation coefficient between it and the dependent variable" (Kerlinger and Pedhazur, 1973: 317). In the above example, the total indirect effects (TIE) of variable X_1 on variable X_3 are

$$TIE_{31} = r_{31} - P_{31}$$

$$\text{where } r_{31} = P_{31} + P_{32} r_{12}$$

Kerlinger and Pedhazur discuss the distinction between main effects and interaction effects in the context of effect coding (1's are assigned to members of a given group, 0's to members of all other groups but one, and the members of this one group are assigned -1's) in factorial designs. The differences between the treatments of one variable X_1 across the treatments or categories of the other variable comprises the main effect of X_1. The interaction effect, on the other hand, is comprised of differences between the categories of one variable (X_1) at each category of the other variables (1973:182). In our final model, none of the capital dependence variables have main effects, indicating that the long term effects of dependence on growth are mediated by other variables. Although the main effects were eliminated by design in order to study the mediating effects, this model is statistically consistent with the data, in that the main effects will not enter the regression equation after the mediating variables have been included.

Two alternative models of the possible relationships between market and economic power dependency are suggested by the fact that either NVAR469 (private foreign investment as a % GDP in 1967) or NVAR449 (gross domestic capital formation as a % GDP in 1960) and IB2NV449 (the interaction between capital formation and position B_2) can be included in the reduced form equation (that is, the equation that specifies the total -- direct and indirect -- effects of the independent variables), but not both. Regardless of whether NVAR469 (PFI in 1967) or NVAR449 (capital formation in 1960) is used as an exogenous variable in the structural equation (the equation that specifies the direct effects of the independent variables on each other and on CHANGEGNP) the direct effects remain unaltered. However, neither NVAR469 nor IB2NV469 have appreciable effects on CHANGEGNP. Moreover, the results are more interpretable when NVAR449, gross domestic capital formation expressed as a percentage of GDP in 1960, is used as the measure of foreign investment, in that all variables but VAR418 (machinery and equipment as % of imports in 1970) and NVAR408 (log of food and raw materials as % of imports in 1970) are affected by capital formation (NVAR449), and the interaction of domestic capital formation with the B_2 countries (IB2NV449) or both. For these reasons, only the result of the second specification (including NVAR449 and IB NV449) of the model is reported. Finally, to be consistent with the analyses presented in previous chapters, appropriate transformations of variables have been used when they are less skewed measures.

1. The Structural Equation (direct effects)

The variables that directly effect CHANGEGNP have, for the most part, strong negative effects. The exceptions are LGNP with a beta of 1.528 and a B of 47.66, NVAR466 (cube root of % change in PFI 1967-1973) with a beta of .337 and a B of 7.429, and the dummy variable representing the outlier, Cameroon, with a beta of .333 and a B of 27.713. The R^2 for the equation is .920 and the adjusted R^2 is .853. For degrees of freedom equal to 10 and 12, the F-value for the equation, 13.754, is significant using conventional levels (see Table 6-1).

In reference to the relationships among the independent variables in the structural equation, the inclusion of IB2NV449 results in the exclusion of both IB2NV408 (interaction of B_2 and log food and raw material imports in 1970) and the main effect of VAR348 (square root of the % DAC aid in 1970), presumably because of the high collinearity of these variables with IB2NV449. One substantive implication of choosing this structural equation is that the long-term negative effect of private foreign investment on growth has not been completely accounted for in the case of the B_2 countries. Another implication is that NVAR348, DAC aid, constitutes an intervening variable only in the case of the A_2 countries (see Figure 6-1).

An analysis of residuals for the equation reveals no pattern of heteroskedasticity. The only candidate for an outlier is the Ivory Coast with a standardized residual of a little less than two.

2. The Reduced-Form Equation

The equation which specifies the total (direct and indirect) effects of the independent variables on CHANGEGNP has an R^2 of .635 and

TABLE 6-1

THE STRUCTURAL EQUATION

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DEPENDENT VARIABLE..     CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  2..    CAMEROON

MULTIPLE R           0.95904          ANALYSIS OF VARIANCE     DF      SUM OF SQUARES       MEAN SQUARE            F          P
R SQUARE             0.91975          REGRESSION               10.         6107.85464         610.78546      13.75412     0.0000
ADJUSTED R SQUARE    0.85288          RESIDUAL                 12.          532.88965          44.40747
STANDARD ERROR       6.66389

------------------ VARIABLES IN THE EQUATION ------------------            ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B            BETA      STD ERROR B        F            VARIABLE      BETA IN      PARTIAL   TOLERANCE          F

LGNP         47.66409         1.52790        6.21659      58.787
IA1NV328    -13.27491        -0.72391        2.15319      38.010
VAR313      -0.7667578       -0.66383        0.16504      21.584
VAR418       -2.230974       -0.85844        0.39582      31.769
NVAR408      -28.44191       -0.43894        8.47401      11.265
NVAR466       7.428580        0.33723        2.86402       6.728
IB2NV408     -6.859543       -0.63667        1.66508      16.971
NVAR348      -7.800063       -0.51164        2.62008       8.863
IA2NV348     -6.897119       -0.31601        2.58867       7.099
CAMEROON      27.71308        0.33260        7.33361      14.280
(CONSTANT)    2.916026
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TABLE 6-2

THE REDUCED-FORM EQUATION

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DEPENDENT VARIABLE..    CHANGENP

VARIABLE(S) ENTERED ON STEP NUMBER  1..    LGNP        LOG GNP PER CAPITA 1965
                                           NVAR449     SQUARE ROOT GROSS DOMESTIC CAPITAL FORMATION AS % GDP 1960
                                           IB2NV449    INTERACTION OF B2 WITH SQUARE ROOT GDCF AS % GDP 1960
                                           NVAR328     SQUARE ROOT SOVIET AND OTHER AS % IMPORTS 1965
                                           IA1NV328    INTERACTION TERM FOR SOVIET AND OTHER IMPORTS WITH POSITION A1

MULTIPLE R            0.79691          ANALYSIS OF VARIANCE     DF      SUM OF SQUARES       MEAN SQUARE           F          P
R SQUARE              0.63507          REGRESSION                5.        4217.30911          843.46182       5.91675     0.0024
ADJUSTED R SQUARE     0.52773          RESIDUAL                 17.        2423.43518          142.55501
STANDARD ERROR       11.93964

----------------- VARIABLES IN THE EQUATION ------------------          ------------ VARIABLES NOT IN THE EQUATION --------------

VARIABLE               B             BETA     STD ERROR B        F      VARIABLE      BETA IN      PARTIAL    TOLERANCE          F

LGNP            31.55309          1.01145        7.40025    18.180      NVAR417       0.01884      0.02540      0.66344      0.010
NVAR449         -5.489138        -0.36405        3.12545     3.084
IB2NV449        -4.507961        -0.52040        1.81396     6.176
NVAR328          6.634670         0.46981        2.55102     6.764
IA1NV328        -9.440724        -0.51482        3.38687     7.770
(CONSTANT)     -94.86845
```

and an adjusted R^2 of .528. $F_{5,17}$=5.916, and all coefficients in the equation are significant at the .05 level (see Table 6-2). The variables included in the equation are LGNP, with an expected positive effect (beta=1.011 and B=31.553), NVAR449 (square root capital formation in 1960) with a moderate negative effect (beta=-.364, B=-5.499), IB2NV449 with a strong negative effect (beta=-.520, B=-4.508). The interesting finding is the change in the magnitude of effect that occurs when the positive effect of NVAR328 (square root % imports from the Soviet bloc in 1965) (beta=0.470, B=6.635) interacts with the A_1 countries to produce a strong negative effect (beta=-0.515, B=-9.441).

To further interpret the results for the reduced form equation, the links betewen NVAR449 and IB2NV449 were established by regressing the aid and trade composition variables in the structural equation on these two variaoles plus LGNP, the trade partner variables, and the dummy variables used to represent the country's position in the world system. Next, the trade-partner variables were regressed on LGNP, NVAR449, IB2NV449, and position in the world system. Finally, in order to validate the use of NVAR449 and IB2NV449 as measures of economic power dependency, LVAR469 (log of private foreign investment in 1967, expressed as the percentage of GNP) was regressed on these variables plus LGNP and world system position. In this way, it was determined how gross domestic capital formation and imports from the Soviet bloc come to have the specified effects on growth.

The antecedents of NVAR466 (cube root of percentage change in private foreign investment from 1967 to 1973) (see Table 6-3): Although short-term percentage change can be represented as being the consequence

TABLE 6-3

THE ANTECEDENTS OF CHANGE IN PFI 1967-1973

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DEPENDENT VARIABLE..     NVAR466

VARIABLE(S) ENTERED ON STEP NUMBER  3..     NVAR449      SQUARE ROOT GDCF AS % GDP 1960

MULTIPLE R            0.68589           ANALYSIS OF VARIANCE     DF       SUM OF SQUARES        MEAN SQUARE              F          P
R SQUARE              0.47044           REGRESSION                3.            6.43812            2.14604         5.62636     0.0062
ADJUSTED R SQUARE     0.38683           RESIDUAL                 19.            7.24709            0.38143
STANDARD ERROR        0.61760

---------------- VARIABLES IN THE EQUATION ------------------          ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE              B           BETA     STD ERROR B        F         VARIABLE     BETA IN     PARTIAL    TOLERANCE          F

B2             1.340101        0.86123         0.33950     15.581       IB2NV449     0.59654     0.21043      0.06590      0.834
LGNP          -1.229977       -0.86853         0.37286     10.882       NVAR328      0.09826     0.12391      0.84200      0.281
NVAR449       0.3787956        0.55341         0.16537      5.247       IA1NV328     0.05247     0.06341      0.77321      0.073
(CONSTANT)     7.513746                                                 VAR313       0.04774     0.04986      0.57754      0.045
                                                                        VAR418       0.05937     0.07169      0.77220      0.093
                                                                        NVAR408      0.13518     0.17982      0.93706      0.601
                                                                        IB2NV408    -0.23551    -0.01950      0.00363      0.007
                                                                        NVAR348      0.39417     0.32111      0.35144      2.069
                                                                        IA2NV348    -0.18092    -0.23347      0.88187      1.038
                                                                        A2          -0.21990    -0.28298      0.87694      1.567
                                                                        A1           0.13331     0.14907      0.66216      0.409
                                                                        B1           0.08323     0.10655      0.86797      0.207
```

of the trade-composition variables and aid, we prefer to present it as the consequence of variables that were measured earlier in time. The multiple R^2's, unadjusted and adjusted, for the equation are 0.470 and 0.387, respectively. The F-value for the equation is 5.626 which, for 3 and 19 degrees of freedom, respectively, is significant using conventional levels of significance. In addition, all variables included in the equation are statistically significant at the .01 level. The variables in the equation are: B_2 (with a B of 1.340 and a beta of 0.861), LGNP (with a B of -1.230 and a beta of -0.869), and NVAR449 (with a B of 0.379 and a beta of 0.553). The finding of more short term percentage change in the B_2 countries is consistent with our interpretation of the B_2 countries as being more closely linked to the core of the modern world system. That is, one manifestation of integration into the core in the case of peripheral countries would be a higher influx of foreign capital. The positive effect of NVAR449 on percentage change lends credence to our interpretation of this variable as a measure of power dependency. We would expect greater short term change in countries whose stock was already relatively high, other things being equal.[10]

The negative effect of LGNP is difficult to interpret. It could mean simply that more developed countries within the periphery are less dependent on the influx of foreign capital for their capital formation. It also may be an artifact of the exceedingly low levels of PFI in the underdeveloped countries in 1967. In such a case, any absolute increase in PFI would register as a large percentage increase. This reasoning, in fact, provided the rationale for taking the cube root of VAR466. Another point to be kept in mind with respect to this argument is that the moderate correlation between LGNP and B_2 could magnify this downward bias.

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[10] Note that the positive effect of NVAR449 on NVAR466, coupled with the positive effect of flows on growth, provides the only positive indirect link between power dependency and growth.

The antecedents of NVAR348 (aid from the DAC countries as a percentage of total aid in 1970) (see Table 6-4): The unadjusted and adjusted R^2's for the equation are 0.781 and 0.732, respectively, and the F-value for the equation is 16.010 which is statistically using conventional levels of significance. The coefficients of all effects in the equation are significant at the .05 level. The variables are: NVAR449 (B=0.436; beta=0.441), IB2NV449 (B=0.607; beta=1.068), VAR313 (B=0.243; beta=0.320), and B_2 (B=-1.873; beta=-0.833). It is important to note that NVAR483 measures not the absolute aid that comes into a country but where the aid, however much it may be, comes from. For this reason, this variable is regarded as a measure of the country's power dependency on the core (DAC) countries circa 1970. Given this interpretation, the positive effects of NVAR449 and IB2V449 on NVAR348 are understandable, even though NVAR348 (DAC aid) is based on bilateral and multilateral aid from "official," non-private agencies. That is, economic power dependency on the core at one point in time is likely to have a positive effect on power dependency on the core at a later point in time. Possibly the same interpretation can be made of the positive effect of VAR313 (% imports from the ex-metropole in 1965) since this variable also can be regarded as where imports come from rather than

TABLE 6-4

THE ANTECEDENTS OF DAC AID IN 1970

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DEPENDENT VARIABLE..    NVAR348

VARIABLE(S) ENTERED ON STEP NUMBER  3..    VAR313     PERCENT IMPORTS FROM EXMETROPOLE 1965

MULTIPLE R            0.85730          ANALYSIS OF VARIANCE    DF      SUM OF SQUARES       MEAN SQUARE              F          P
R SQUARE              0.73497          REGRESSION               3.           21.00040           7.00013         17.56346     0.0000
ADJUSTED R SQUARE     0.69312          RESIDUAL                19.            7.57268           0.39856
STANDARD ERROR        0.63132

---------------- VARIABLES IN THE EQUATION -----------------          ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE             B              BETA      STD ERROR B         F          VARIABLE       BETA IN      PARTIAL    TOLERANCE           F

NVAR449      0.5959601           0.60257       0.12502       22.724          LGNP           0.14134      0.16863      0.37722       0.527
IB2NV449     0.1679129           0.29551       0.08245        4.148          NVAR328        0.03425      0.05778      0.75430       0.060
VAR313       0.2122095E-01       0.28009       0.01156        3.373          IANV328        0.05490      0.09466      0.78796       0.163
(CONSTANT) -0.7027827                                                        B2            -0.83306     -0.41492      0.06575       3.743
                                                                             A2            -0.02125     -0.03684      0.79638       0.024
                                                                             A1             0.10735      0.17301      0.68838       0.555
                                                                             B1            -0.00413     -0.00730      0.82708       0.001
```

how much. The negative effect of B_2 is difficult to interpret. We are tempted to attribute it to the high collinearity between B_2 and IB2NV449 (r=0.949). Statistically, the function of this main effect is to reduce the difference between the % DAC aid received by the B_2 and non-B_2 countries for a given level of NVAR449.

The antecedents of NVAR408 (food and raw materials as a % of total imports) (see Table 6-5): The unadjusted and adjusted R^2's for the equation are 0.490 and 0.378, respectively, and the F-value for the equation is 4.340 which for 4 and 18 degrees of freedom, respectively, is significant at conventional levels of significance. The variables in the equation are significant at least at the 0.10 level. The variables are: NVAR328 (B=0.065; beta=0.298), IA1NV328 (B=0.097; beta=0.342), IB2NV449 (B=0.056; beta=0.420), B_1 (B=0.482; beta=0). It is interesting to note that the main role of NVAR408 as an intervening variable is to account (in part) for the negative effect on the economic growth of the A countries of percentage imports from the Eastern bloc countries. The positive main effect of NVAR328 on NVAR408 provides evidence for the existence of a positive indirect effect of NVAR328 on economic growth. Since the reduced form equation reveals a negative indirect effect of NVAR328 on growth, however, this finding is not too illuminating.

The fact that food and raw materials constitute a greater percentage of total imports for the B_1 countries could represent either climatic conditions that prevailed in that part of Africa around that time or the fact that a relatively larger proportion of the arable land of these countries is devoted to cash crop production. The latter

TABLE 6-5

THE ANTECEDENTS OF FOOD AND RAW MATERIAL IMPORTS IN 1970

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VARIABLE(S) ENTERED ON STEP NUMBER  4..    IMNV328     INTERACTION TERM FOR SOVIET AND OTHER IMPORTS WITH POSITION A1

MULTIPLE R              0.70066       ANALYSIS OF VARIANCE    DF      SUM OF SQUARES       MEAN SQUARE            F          P
R SQUARE                0.49093       REGRESSION               4.            0.77646           0.19411        4.33960     0.0124
ADJUSTED R SQUARE       0.37780       RESIDUAL                18.            0.80516           0.04473
STANDARD ERROR          0.21150

---------------- VARIABLES IN THE EQUATION ------------------        ------------ VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B             BETA      STD ERROR B      F          VARIABLE     BETA IN     PARTIAL    TOLERANCE        F

NVAR328      0.6489017E-01      0.29774       0.04493      2.086        LGNP        -0.19310    -0.22237     0.67507       0.884
B1           0.4818003          0.61877       0.15938      9.139        NVAR449     -0.19667    -0.25555     0.85953       1.188
IB2NV449     0.5614783E-01      0.42000       0.02835      3.921        VAR313      -0.16785    -0.16288     0.47934       0.463
IMNV328      0.9689108E-01      0.34237       0.06825      2.015        B2           0.16621     0.06753     0.08403       0.078
(CONSTANT)    2.905027                                                  A2          -0.05431    -0.05644     0.54986       0.054
                                                                        A1           0.02518     0.01835     0.27046       0.006
```

interpretation is, of course, consistent with the market dependency formulations of the "dependencia" theorists (although they focus on exports rather than imports). Either interpretation probably could be made of the interaction of NVAR449 with B_2 in its effect on NVAR408. Whatever interpretation is chosen, however, the fact is that little of the variance in NVAR408 is explained, and, of the different measures of economic power dependency on the core, only IB2NV449 has a significant effect. Consequently, we conclude that these findings provide only a partial picture of how economic power dependency in the structural equation negatively affects growth. (The partial picture results from the impact of IB2NV449 on NVAR 408 times the negative effect of NVAR408 on growth which, as the structural equation shows, is stronger in the case of the B_2 countries.)

Antecedents of VAR418 (imports of machinery and equipment as a percentage of total imports, 1970) (see Table 6-6): The unadjusted and adjusted R^2's for the equation are 0.511 and 0.434, respectively. The F-value for the equation is 6.630 which, for 3 and 19 degrees of freedom, respectively, is significant using conventional levels of significance. In addition, the effects of all the variables in the equation are significant at the .05 level. The variables are: NVAR328 (B=-3.536; beta=0.651), LGNP (B=4.882; beta=0.407), and VAR313 (B=-0.615; beta= -0.372). The main finding that emerges is a statistical explanation of the way in which NVAR 328 (imports from Eastern bloc countries as a percentage of total imports) indirectly increases growth. While this finding is difficult to interpret it may indicate that trade with the Eastern bloc countries is such that these countries are so underdeveloped

TABLE 6-6

THE ANTECEDENTS OF MACHINERY AND EQUIPMENT IMPORTS IN 1970

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DEPENDENT VARIABLE..    VAR418     MACHY & EQUIP AS PERCENT IMPORTS 1970

VARIABLE(S) ENTERED ON STEP NUMBER  3..     VAR313     PERCENT IMPORTS FROM EXMETROPOLE 1965

MULTIPLE R           0.71515         ANALYSIS OF VARIANCE     DF      SUM OF SQUARES        MEAN SQUARE           F          P
R SQUARE             0.51143         REGRESSION                3.          502.84980          167.61660       6.62975     0.0030
ADJUSTED R SQUARE    0.43429         RESIDUAL                 19.          480.36759           25.28250
STANDARD ERROR       5.02817

---------------- VARIABLES IN THE EQUATION ------------------         ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE             B            BETA     STD ERROR B      F          VARIABLE       BETA IN      PARTIAL    TOLERANCE          F

NVAR328      -3.535825        -0.65069        0.98482    12.890        NVAR449        0.14892      0.17014      0.63771        0.537
LGNP          4.882150         0.40672        2.10739     5.367        IB2NV449      -0.13020     -0.13917      0.55814        0.355
VAR313       -0.1654750       -0.37232        0.08529     3.764        IMNV328       -0.05362     -0.06499      0.71774        0.076
(CONSTANT)    18.28249                                                 B2            -0.13398     -0.15793      0.67885        0.460
                                                                       A2             0.09927      0.11156      0.61705        0.227
                                                                       A1            -0.01236     -0.01662      0.88326        0.005
                                                                       B1             0.09749      0.13217      0.89798        0.320
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that they aren't even to the point of importing machinery. The positive effect of LGNP makes sense. Relatively well developed countries are better able to afford to import machinery and equipment. The negative effect of VAR313 (imports from the ex-metropole as a percentage of total imports) also is puzzling since this finding presents evidence for the existence of a positive indirect effect of VAR313 on growth, whereas both the direct effect and indirect effect via NVAR348 are negative. Regardless of the interpretation that is attached to individual effects, however, what the set of findings shows is that VAR418 is even less successful than NVAR408 at providing understanding of how power dependency negatively affects growth.

Antecedents of VAR313 (imports from the ex-metropole as a percentage of total imports in 1965) (see Table 6-7): The unadjusted and adjusted R^2's for the equation are 0.400 and 0.340 respectively. The F-value for the equation is 6.675 which, for 2 and 20 degrees of freedom, respectively, is significant using conventional levels of significance. In addition, the coefficients in the equation are significant at or near the 0.05 level. The variables are: IB2NV449 (B=4.142; beta=0.552) and NVAR449 (B=3.847; beta=0.295). Since this variable represents where imports are from, rather than the absolute amount of imports, we choose to regard VAR313 as another measure of the country's power dependency on the core. This interpretation is consistent with the fact that import ties with the ex-metropole are solely a function of NVAR449 and IB2NV449, although the percentage of explained variance could be higher. This interpretation, moreover, provides further support of the finding earlier of the effect of VAR313 on NVAR348 (aid from the DAC countries as a percentage of total aid).

TABLE 6-7

THE ANTECEDENTS OF IMPORTS FROM THE EX-METROPOLE IN 1965

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VARIABLE(S) ENTERED ON STEP NUMBER  2..    NVAR449     SQUARE ROOT GDCF AS % GDP 1960

MULTIPLE R            0.63270          ANALYSIS OF VARIANCE     DF      SUM OF SQUARES      MEAN SQUARE             F          P
R SQUARE              0.40031          REGRESSION                2.         1992.54936        996.27468        6.67537     0.0060
ADJUSTED R SQUARE     0.34034          RESIDUAL                 20.         2984.92890        149.24645
STANDARD ERROR       12.21665

----------------- VARIABLES IN THE EQUATION ------------------          ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B            BETA      STD ERROR B         F          VARIABLE      BETA IN      PARTIAL    TOLERANCE          F

IB2NV449      4.142482        0.55236        1.29907      10.169          LGNP       -0.18251     -0.14632      0.38548      0.416
NVAR449       3.846822        0.29469        2.26115       2.894          B2          0.43048      0.14404      0.06714      0.403
(CONSTANT)   18.41579                                                     A2         -0.26368     -0.32081      0.88775      2.180
                                                                          A1         -0.00909     -0.00974      0.68845      0.002
                                                                          B1          0.22385      0.27329      0.89384      1.534
```

The antecedents of NVAR328 (square root of imports from Eastern bloc countries as a percentage of total imports in 1965) (see Table 6-8): The unadjusted and adjusted R^2's for the equation are 0.240 and 0.120, respectively. The F-value for the equation is 2.003, which at 3 and 19 degrees of freedom, respectively, is not significant at even the 0.10 level, although some of the individual coefficients in the equation approach significance. The variables are: NVAR449 (B=-0.376; beta= -0.352), A_1 (B=0.921; beta=0.352), and B_1 (B=0.907; beta=0.254). Because of the low R^2, it is perhaps best to regard NVAR328 as making a separate contribution to growth, apart from the effects of power dependency. On the other hand, the finding that NVAR449 is negatively correlated with trade with Eastern bloc countries is tempting to interpret in the context of world system theory. That is, those countries that are freer from financial ties with the core are better able to diversify their trading relationships. The other finding of interest is the fact that a slightly greater percentage of total imports is received by the A and B_1 countries. (It is possible that introducing a dummy variable that combined both countries would be significant and also would result in a significant value of F for the whole equation.) With respect to the contribution of NVAR328 in explaining the negative indirect effects of power dependency on growth, however, the bottom line is that it provides no link between either NVAR449 or IB2NV449 and growth.

The antecedents of LVAR469 (log of private foreign investment as a percentage of GNP in 1967) (see Table 6-9): Although LVAR469 was eliminated from both structural and reduced-form equations, we regressed it on NVAR449 and IB2NV449 plus LGNP and the measures of world system

TABLE 6-8

THE ANTECEDENTS OF IMPORTS FROM THE EASTERN BLOC IN 1965

```
DEPENDENT VARIABLE...    NVAR328

VARIABLE(S) ENTERED ON STEP NUMBER  3..    B1

MULTIPLE R           0.49020          ANALYSIS OF VARIANCE     DF      SUM OF SQUARES       MEAN SQUARE            F           P
R SQUARE             0.24029          REGRESSION                3.            8.00141           2.66714      2.00323     0.1477
ADJUSTED R SQUARE    0.12034          RESIDUAL                 19.           25.29689           1.33142
STANDARD ERROR       1.15387

---------------- VARIABLES IN THE EQUATION -----------------          ------------ VARIABLES NOT IN THE EQUATION -------------

VARIABLE           B            BETA     STD ERROR B        F            VARIABLE      BETA IN     PARTIAL   TOLERANCE          F

NVAR449     -0.3756873        -0.35187       0.21455     3.066           LGNP          0.20686     0.16402     0.47762      0.498
A1           0.9213184         0.35233       0.54320     2.877           IB2NV449      0.12684     0.09842     0.45746      0.176
B1           0.9075927         0.25403       0.74046     1.502           B2            0.14938     0.10866     0.40194      0.215
(CONSTANT)    2.184362                                                   A2           -0.10149    -0.10866     0.87087      0.215
```

TABLE 6-9

THE ANTECEDENTS OF PFI IN 1967

```
DEPENDENT VARIABLE..    LVAR469

VARIABLE(S) ENTERED ON STEP NUMBER  1..     NVAR449      SQUARE ROOT GDCF AS % GDP 1960
                                            IB2NV449     INTERACTION OF B2 WITH SQUARE ROOT GDCF AS % GDP 1960

MULTIPLE R             0.75003
R SQUARE               0.56254      ANALYSIS OF VARIANCE    DF      SUM OF SQUARES      MEAN SQUARE          F           P
ADJUSTED R SQUARE      0.51880      REGRESSION               2.           16.68315          8.34157     12.85938      0.0003
STANDARD ERROR         0.80540      RESIDUAL                20.           12.97353          0.64868

----------------- VARIABLES IN THE EQUATION ------------------      ------------- VARIABLES NOT IN THE EQUATION -------------

VARIABLE            B               BETA      STD ERROR B      F        VARIABLE      BETA IN      PARTIAL    TOLERANCE        F

NVAR449       0.6208644          0.61617        0.14907    17.346       LGNP         0.28350      0.26612      0.38548     1.448
IB2NV449      0.2385533          0.41209        0.08564     7.759       B2           0.69381      0.27181      0.06714     1.516
(CONSTANT)   -2.388614                                                  A2           0.07822      0.11143      0.88775     0.239
                                                                        A1          -0.06688     -0.08390      0.68845     0.135
                                                                        B1          -0.08402     -0.12010      0.89384     0.278
```

in order to check on the validity of our interpretation of variation in NVAR449 and IB2NV449 as representing variation in private foreign investment or foreign-controlled internal investment. The unadjusted and adjusted R^2's are 0.563 and 0.519, respectively. The F-value for the equation is 12.859, which for 2 and 20 degrees of freedom, respectively, is significant using conventional levels of significance, and the effects of both variables are also statistically significant. The variables in the equation are: NVAR449 (B=0.621; beta=0.616) and IB2NV449 (B=0.239; beta=0.412). Thus, over half of the variance in private foreign investment is a consequence of NVAR449 and IB2NV449. Although this finding could be interpreted as showing that countries with a relatively large capital base are more likely to attract foreign investment, we prefer to interpret these effects as representing the autoregression of stock in private foreign and foreign-controlled investment from one time period to the next. The significance of the interaction between B_2 and NVAR449 is that the autoregression is stronger in the case of the B_2 countries. This interaction is consistent with our argument that the B_2 countries are more integrated into the modern world system. We would expect that the patterns of foreign investment and foreign control of capital formation to be more established in such countries.

Summary

In summary, there are two models that may be used to specify the linkages between private foreign investment and economic growth. Although the two specifications have similar structural equations, one uses 469 etc., the other uses 449 etc. The differentiation of components turned on the reduced form of the model. The model chosen includes the transformed versions of VAR449 and IB2NV449, and is the most representative model for two reasons. First, it is consistent with our previous analyses in that the transformed versions of variables are used where the skewedness of the variables suggest that transformation is appropriate. Second, NVAR449 and IB2NV449 permit the specification of direct links between components of the reduced form equation and growth.

The reduced form of the final model includes initial level of development; gross domestic capital formation in 1960; the interaction of gross domestic capital formation with the dummy variable for the B_2 countries; and the interaction of these imports with the dummy variable for the A_1 countries. The structural form of the equation for the final model does not contain any long-term direct effects of economic power dependency on growth. The inclusion of the interaction between position B_2 and gross domestic capital formation results in the exclusion of the interaction between the B_2 countries and imports of food and raw materials, and the exclusion of the main effect of DAC aid, which constitutes an intervening variable only in the case of the A_2 countries.

With respect to the indirect effects indicated by the reduced form model, either gross capital formation or private foreign investment could have been used to measure the long term negative effects of investment dependent. The equation choses uses the transformed version of gross domestic capital formation and the interaction term for the B_2 countries and gross domestic capital formation. The other variables included in the reduced form equation are initial level of development with a strong positive effect on growth, the main positive effect of Soviet imports and the negative interaction of Soviet imports with the

A_1 countries. Upon examination of the mediating effects with respect to gross domestic capital formation and the interaction of this variable with the B_2 countries, they are by and large due to the effects of these variables on DAC aid and the percentage of imports from the ex-metropole. Moreover, the regression of the transformed version of private foreign investment on its temporal antecedents results in only the gross capital formation variables having significant effects. The conclusion that these findings lead to is that there exists a constellation of dependency variables that hinges on the reference, at different points in time, to the connection of peripheral countries to the core. This constellation shows the negative effect of this integration. Finally, the long term negative effects are indirect in the sense that peripheral countries connected to the core in 1960 are likely to be connected similarly in 1970.

The trade variables, with the exception of raw material and food imports, do not mediate between gross domestic capital formation and economic growth. The interaction of gross domestic capital formation with the B_2 countries has a positive effect on raw material and food imports, and since the negative direct effect of raw material and food imports on growth is larger for the B_2 countries, it is possible to specify an indirect effect of gross domestic capital formation on growth via raw materials and food inports that is specific to the B_2 countries. The problem is that it is not clear in the reduced form equation if the interaction or the main effect of the B_2 position in the world system should come in. Both are consistent with the data.

The last effect in the reduced form equation, the main positive effect of Soviet imports, results from the fact that these imports are negatively related to imports of machinery and equipment. One way in which the negative interaction of Soviet imports with the A_1 countries is illustrated is through the positive effect of both variables (Soviet imports and A_1) on imports of food and raw materials. It is not clear, however, if the relationship is causal. Therefore, the Soviet variables remain an enigma in terms of clearcut indirect effects on growth, however the main pattern of dependence variables having positive effects on other dependency variables is consistent over the time period studied and thereby indicative of at least preliminary support for our choice of model. Finally, inspection of the residuals reveals no problems of heteroskedsticity once Cameroon is entered as a dummy variable.

CHAPTER SEVEN

SUMMARY AND CONCLUSIONS

The purpose of this thesis has been to examine the economic growth of Black African countries in light of recent findings concerning the effects of foreign direct investment, external trade and world-system position on growth. In Chapter One, we put the problem in a general theoretical context. The studies reviewed reflect the conceptual development of the world-system perspective from the Marxist critique of conventional economic and socio-political explanations of the prospects of Third World development. The main point of contention between the classical theories and their critics concerns whether or not Third World economic history is best characterized as a replica of the European prototype (a smooth, internally-initiated process of progressive structural transformations) or as a unique and discontinuous process that is both externally generated and regressive, in the sense that it aborts the indigenous sequence and replaces it with a totally inappropriate set of transformations.

In the context of a critique of modernization theory, we discussed the recent work of researchers such as Portes (1973a, 1973b, 1976) and Delacroix and Ragin (1977, 1978) who, while writing from the point of view of modernization theory, have attempted to take the dependency theory/world-system perspective into account. This approach appears to perpetuate the fundamental mistake of modernization theory for one or both of two reasons. It either continues to take the individual as the unit of analysis and focuses on individual attitudes and statuses as as independent variables in explaining the degree of individual participation in capitalist activities (as Portes does). Or it takes the country as the unit of analysis but fails to specify the link between individual attitudes, statuses, and behaviors and the properties of the countries (as Delacroix and Ragin do). In the case of the world-system/dependency theory perspective, on the other hand, both the theoretical and empirical units of analysis are the nation-states viewed within the larger context of the world system.

Africa offers a particularly good example of the compatibility of the world system arguments with patterns of contemporary economic underdevelopment. Not in any sense underdeveloped at the time of her incorporation into the world economy, Africa's developmental process became subordinated to the economic and political interests of the major western powers via a sequence of regional incorporation that corresponded to the needs of the European core. West Africa was the first region to be incorporated as the exporter of slaves. Further incorporation occurred as the demand for primary products increased along with economic and political incentives for large scale cash crop production. As the economy of West Africa became geared to the production of export crops, the slave trade shifted to East Africa. This shift was followed by the discovery of mineral resources, and with the help of huge labor reserves, the multinational interests in mining became dominant in eastern and southern African economies.

The inescapable conclusion of the discussion of African history is that the classical economics and socio-political sequence of internally-generated development is applicable to Africa's economic history only until Africa's eighteenth century incorporation into the world economy. At this time, the developmental motor was no longer endogenous. Europe's qualitative increase in the demand for slaves, her need for new areas of primary production, and her interests in Africa's mineral resources dictated, to a large extent, where economic incentives were directed during the period of Africa's colonial administration. By the end of the nineteenth century, the extensive and intensive integration of Africa into the world economy had reorganized Africa's exporting regions, weakening the African state structure and thereby setting the parameters within which Africa's relationships with the rest of the world would take place.

Chapter Two draws the distinction between the comparative-historical, dependencia (most commonly found among the Latin American specialists), and empirical orientations within the world-system perspective. Within the context of the quantitative approaches, a further distinction can be drawn between two types of dependency that result from incorporation into the world economy: (1) market dependency or the strong effect that metropolitan capitalist economies have on an underdeveloped economy via links with the world markets, and (2) economic power dependency or the subordination of internal decision-making power to the decisions of individuals, firms, and agencies based in the capitalist metropoles.

Market dependency is characteristically operationalized in the context of trading partner and trade commodity composition, with the emphasis on Third World exports. What flows out of the economy, to whom, and how much is considered indicative of the susceptibility of a country or region to changes in the world economy that may or may not be advantageous to the domestic economy. Moreover, it is argued that the transnational linkages established prevent the establishment of internal sectoral linkages thereby preventing the domestic economy from gaining most of the benefits of increased production.

Power dependency focuses on the effects of foreign investment and aid. It is a study of flows into the underdeveloped economy that are purported to establish control structures by which transnational economic interests can influence internal economic decisions. The credit component of aid has important implications for dependence that are not often considered. For example, interest amortization payments must be met regardless of whether or not the projects funded by loans have successfully entered production. Moreover, the selective allocation of aid to sectors and industries is an indirect control of economic priorities within the underdeveloped economy. The control structure of foreign investment is more direct. Foreign direct investment confers ownership. Add to this the benefits of transnational financial assets, extraterritoriality, tariff-jumping and monopolistic advantage and the mechanisms of how internal economic distortions result begin to take shape.

The two important studies that illustrate the power dependency approach are Bornschier et al. (1978) and Snyder and Kick (1979). Bornschier et al. find, first, short term positive and long term negative effects of foreign direct investment on growth. Second, they find an interaction of the negative long term effects with the richer developing countries. Snyder and Kick operationalize the world system structure in terms of four networks of variables, the most significant of which, particularly for Africa, is the network associated with trade. Africa is integrated into the world economy primarily through its trade with the core. The real utility of Snyder and Kick's blockmodel for our purposes is the correspondence between their differentiation between A and B peripheral positions and our historical analysis of Africa. The B countries are located on and just to the interior of the African West Coast. The A countries lie in the geographical regions of Central, North, and North-East Africa. In very broad terms, the B countries were the first to be incorporated into the capitalist world-system, and the A countries were next.

The methods used to replicate the Bornschier et al findings, to include Snyder and Kick's blockmodel partition as a control for world-system position, and to integrate the model into the dependency literature are discussed in Chapter Three under the headings of research design, measurement and analytic strategies. Our research design is a panel step-wise regression analysis of cross-sectional data on Black African countries. The dependent variable, economic growth is a proxy for development, measured as per cent change in GNP from 1965 to 1973. The step-wise regression method was used both as an initial screening device for selecting potentially illuminating independent variables and for estimating the final models.

The problems raised by regression analysis include problems of (1) nation size, aggregation and heteroskedasticity, (2) multicollinearity, (3) data inadequacies and (4) sample size. We have controlled for the heteroskedasticity in the independent variables that is related to size of nation by norming the variables on the size of the national economy. Our procedure for dealing with multicollinearity is to assume that highly correlated variables represent measures of the same latent variable. The procedural implications of this assumption are that each variable is run separately and examined for different results. The equation that best represents the theory is the equation chosen. Data inadequacies were not a major problem in our analysis because the variables examined were standard economic indicators. Where gaps were evident in the data, they were distributed among a small, consistent set of countries. Although sample size was a problem, we chose to analyze a small set of countries on the grounds that the causal mechanisms operating in the two extreme African peripheral blocks may differ from those that operate in other parts of the world. We suspect that large, undifferentiated samples may, in fact, obscure the very mechanisms they are intended to study.

The analytical procedure followed is relatively straightforward. First, the main effects of untransformed independent variables on economic growth were determined, then the skewed variables were transformed and differences in the effects were noted. Second, interactions between the relevant variables and dummy variables representing world system position were examined. This strategy has permitted the elimination of variables with insignificant effects from the model.

As suggested by the empirical literature review, the preliminary data analyses are approached by differentiating between variables associated with trade and variables associated with foreign investment and aid. The two sets are run separately and then combined to compare the effects for the B_2 and non-B_2 countries. This procedure allows an examination of the differential impact of position in the world system on the trade, investment and aid variables.

Chapter Four outlines the findings for the effects of private foreign investment and aid dependence on economic growth. The results for the untransformed variables support the Bornschier et al. distinction between short term positive and long term negative effects of foreign investment. The negative effect of domestic savings (measured by gross capital formation as a % GDP in 1960) on growth is resolved within the world system framework by treating capital formation as a proxy for PFI in 1960. Support for this interpretation is provided by the strong positive correlation between domestic capital formation in 1960 and PFI in 1967., In the step-wise regression, the magnitude of the effect of PFI in 1967 (VAR469) drops as gross capital formation (VAR449) and its interaction with the B_2 countries (IB2V449) are entered; and, the partial beta that would be associated with the interaction between PFI and B_2 suggests that the main effect of private foreign investment for the B_2 countries may be attributed to the interaction of gross capital formation and the B_2 countries.

The transformed set yields similar results on the short and long term effects of foreign investment on growth. However, the negative effect of PFI is not robust for all twenty-seven countries with respect to the transformation of the measure of stock of private foreign investment; the effect is limited to the B_2 countries. This interaction is consistent with the Bornschier et al. interaction between the negative effects of foreign investment and the richer (higher level of initial

GNP) underdeveloped countries.

Although our final model suggests that the apparent spuriousness of VAR348 (DAC aid as a % total aid in 1970) or its transformation (VAR348) uncovered in Chapter Four may be misleading, the preliminary analysis yields a negative short term effect of DAC aid. The preferred interpretation of the negative effect of DAC aid on growth as a consequence of the mediating capacity of DAC aid between the long term negative effects of imports from the ex-metropole (VAR313) and stock of private foreign investment (NVAR499)on growth (CHANGEGNP).

Chapter Five is best read as an exploratory chapter whose final conclusions, unfortunately have little carry over to selection of a final model in Chapter Six. The procedure followed may be outlined briefly. The trade variables were divided into sets: one related to partner-composition and the other related to commodity-composition. There were analyzed separately and then combined to look at the effects of trade-partner variables on trade composition. Although all the trade-partner and two trade composition variables plus the interaction of partner and commodity composition with world-system position appear in the final model, the preliminary combination of the variables results in the effects of trade-partner variables becoming zero and the effects of trade commodity remaining high. Rather than summarizing the results of this analysis, we merely point out that the results for the B_2 countries bear a stronger resemblance than do the results for the non-B_2 countries, to the role played by the trade partner and trade commodity variables in the final model. This fact could be taken as further evidence that the B_2 countries are more closely integrated into the core (recall that the image matrix for trade most closely reflected integration into the world system, Snyder and Kick, 1979). Thus, in the case of peripheral countries, one would expect them to reveal the effects of market dependency.

Discussion

There are two issues to be raised in this discussion. The first is whether the findings are a statistical artifact. In particular, we will address the implications of using correlated ratios in the analysis. Second, assuming that the findings are meaningful, what do they tell us about African underdevelopment? In this context, a few, brief suggestions for future research may be offered.

Long (1980:69) concludes a recent article on the use of ratio variables by pointing out "that while [a correlation between two variables] might reflect a true causal link between [the] ratios, it may have arisen simply vecause of errors in measuring their components." She goes on to argue that some attempt should be made to assess the nature and direction of the biases that operate. Any rigorous attempt to do so lies beyond the scope of this thesis. Nevertheless, we will spend a few lines discussing the possibility of the bias in the correlation between various measures of power dependency and growth.

The finding of a negative long-term effect of power dependency on growth rests largely on the small positive correlation between CHANGEGNP and the measure of power dependency in question (say NVAR449, for the sake of argument). (The negative effect appears when CHANGEGNP is regressed on NVAR449, controlling for LGNP.) The question that arises is whether the low magnitude of the correlation is a consequence of the negative effect of power dependency on growth or whether it is an artifact produced by dependencies among variables of interest (growth in domestic capital formation and growth) and the variables used as weights (GDP, 1960 and GNP, 1965). The relevance of Long's results to this question, however, is indirect because she focuses on the consequences of the dependency between Y and Z for the correlation of Y/Z ratio, whereas we are concerned with the correlation of gross domestic capital formation in 1960/GDP in 1960 with the difference between GNP in 1973 and GNP in 1965/GNP, 1965.

In other words, the problems raised by regarding the correlation of ratios occurs when the denominator of the ratio (the dependent variable) and the independent variable are the same. Since the two ratios we are interested in (NVAR449 and CHANGEGNP) contain no common terms, it is not clear to what extent the problems raised by Long and others apply to this analysis. On the other hand, we cannot be completely sanguine about these problems since even though there are no formal dependencies, the numerator of one ratio is likely to correlate positively with the denominator of the other. Clearly, a more definitive statement regarding the possible bias in the results awaits further methodological work on the problem of analyzing correlations among ratios.

If these findings are meaningful, what do they tell us about African underdevelopment? The results show a clear negative effect of power dependency on the growth of African countries. In this context, VAR313 (imports from the ex-metropole, 1965) and VAR348 (DAC aid) are interpreted as indicators of the extent to which African regions are economically tied to (or power dependent on) the core. Similarly

NVAR449 (square root of domestic capital formation, 1960) is regarded as representing the stock of foreign direct investment from the core. While there is no direct evidence, nevertheless, this interpretation is consistent with the effects of these variables on NVAR469 and on the variables in the structural equation: flows of foreign private investment, DAC aid and percent imports from the ex-metropole.

The substantive reason for regarding gross domestic capital formation as a proxy for stock of foreign private investment is tied to the historical analysis of Africa's incorporation into the world-system. As core interests shifted towards cash-crop production and mineral exploitation, first, government and then multinational investment was pumped into Africa's export industries. On the other hand, agricultural production for the domestic market was allowed to stagnate and/or depend on domestic investment and official bilateral and multilateral aid. According to the OECD figures and estimates, the stock of DAC-based investments in Africa in 1972 was $9.4 billion U.S., an increase of about 43% over the 1967 estimate of close to $6.6 billion. Although the change in aggregate investments in Africa represents a relative decline compared to the total percentage growth of world investment stock (60%), it should be kept in mind that the accumulated stock of African investment provides a substantial basis for the reinvestment of profits made by subsidiaries of multinationals back into the industries that proved to be the most productive. Much of the GNP of African economies is generated in such a fashion. Therefore new foreign investment and continued reinvestment of foreign-controlled profits would contribute substantially to gross capital formation without necessarily facilitating the beneficial economic linkages usually attributed to accumulated domestic savings.

The thesis has shown that power dependency has a negative effect on economic growth and that this effect manifests itself in different ways at different points in time. The main finding is a negative indirect effect of gross capital formation, measured in 1960, on economic growth via the direct negative effects on growth of imports from the ex-metropole, measured in 1965 and DAC aid measured in 1970. In contrast to Bornschier et al., who suggest that only the long term effects of aid will be negative, negative short term effects were found as well. The stability of the incorporation of the African periphery into the world system is evident in the effects of gross capital formation and in the effects of the interaction of gross capital formation with the B_2 countries on aid (measured in 1970) and imports from the ex-metropole (measured in 1965). Moreover, the interaction of power dependency with the B_2 countries suggests that the pattern of incorporation into the world system is more clearly established with the region of the periphery that has been integrated into the world economy for the longest time.

What has not been done in thesis, and is a suggestion for future research, was to identify the underlying mechanisms by which power dependency retards economic growth. Possible variables of interest are state strength, secondary school education, class structure and economic differentiation, regime type, and political participation. The trade composition variables examined in this thesis do not appear to intervene between the features of the world system and growth. They are either independent effects of antecedent variables, for example, the import of machinery and equipment shows how statistically, trade with the Soviet Union and other East European countries has an indirect positive impact on economic growth; or, as in the case of the interaction of imports of machinery and equipment with the B_2 countries, the trade composition variables appear in interaction terms that either cancel or override the main effects.

In conclusion, this thesis has reviewed and summarized findings about two particular types of dependency relationships that exist in the world system. The contribution to isolating these relationships empirically and future research on the underlying mechanisms should be accepted as initial steps in the building of a theory of development.

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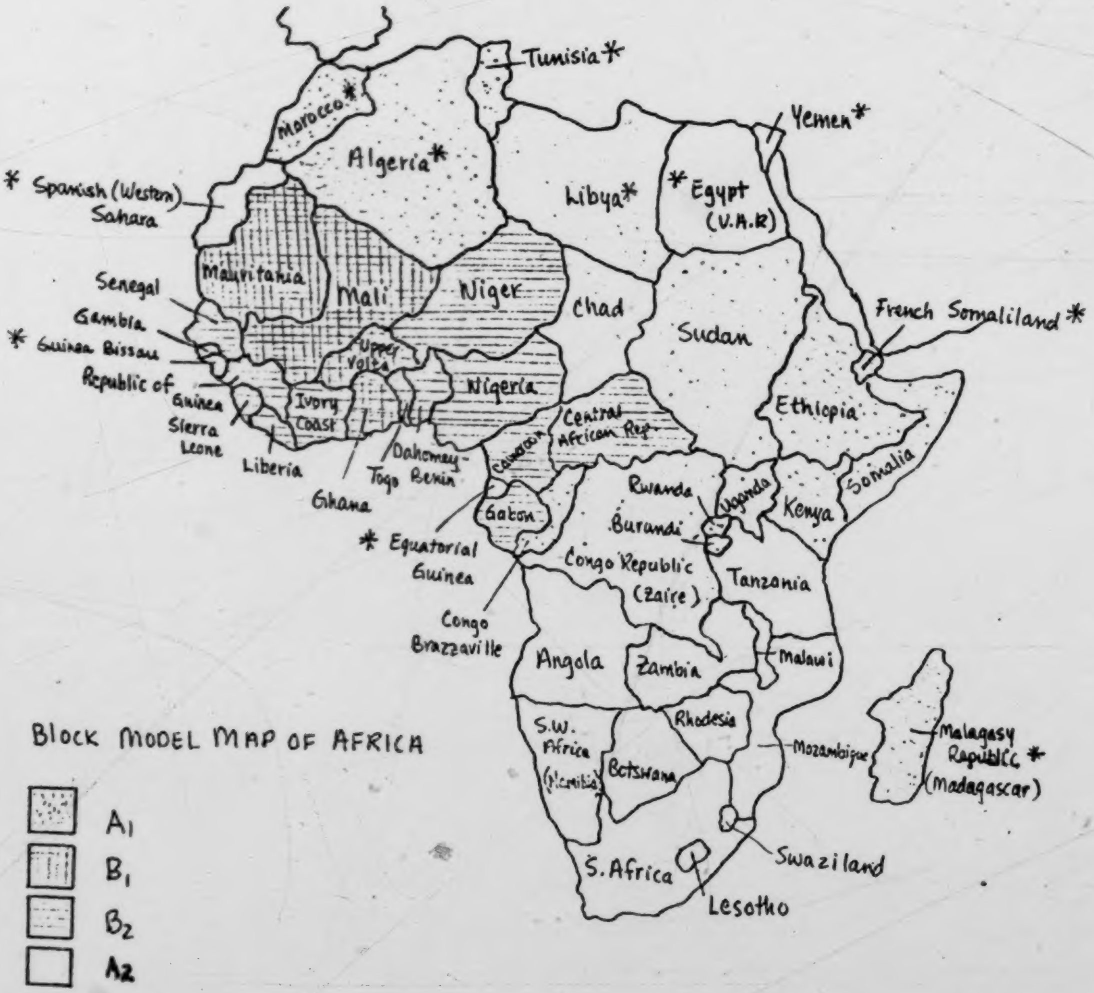
APPENDIX 1

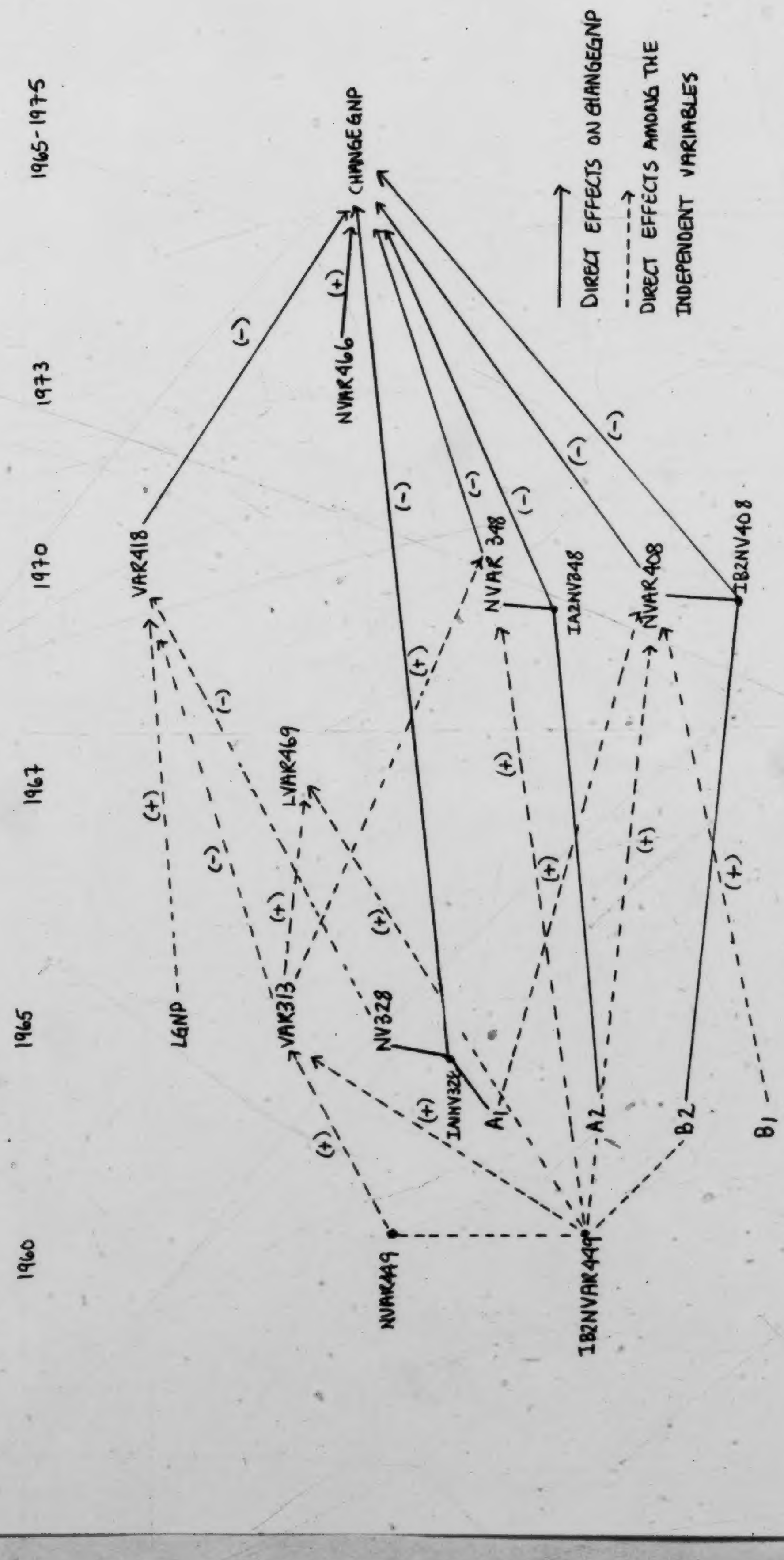


BLOCK MODEL MAP OF AFRICA

* Countries not included in the 33 country data set.

APPENDIX 2

STRUCTURAL EQUATION MODEL



APPENDIX 3

CORRELATION MATRIX

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CORRELATION COEFFICIENTS

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.


            CHANGENP   LGNP       LVAR469    NVAR449    IB2NV449   NVAR328    IA1NV328   VAR313     VAR418     NVAR408    NVAR466    IB2NV408

CHANGENP     1.00000    0.51020    0.20839    0.07948    0.13904    0.19559   -0.24945   -0.14512    0.06662   -0.11659   -0.21407    0.18945
LGNP         0.51020    1.00000    0.68905    0.57433    0.54814   -0.24421   -0.20942    0.40167    0.41608   -0.18916   -0.18704    0.42669
LVAR469      0.20839    0.68905    1.00000    0.62677    0.42793   -0.63960   -0.43336    0.42675    0.49786   -0.23319    0.03653    0.34349
NVAR449      0.07948    0.57433    0.62677    1.00000    0.02572   -0.31446   -0.04612    0.30889    0.41817   -0.24343   -0.07922   -0.15198
IB2NV449     0.13904    0.54814    0.42793    0.02572    1.00000   -0.22687   -0.42922    0.55994    0.08942    0.00604    0.39474    0.94900
NVAR328      0.19559   -0.24421   -0.63960   -0.31446   -0.22687    1.00000    0.50454   -0.46154   -0.57818    0.46801   -0.03073   -0.16325
IA1NV328    -0.24945   -0.20942   -0.43336   -0.04612   -0.42922    0.50454    1.00000   -0.37692   -0.31163    0.18874   -0.19259   -0.45147
VAR313      -0.14512    0.40167    0.42675    0.30889    0.55994   -0.46154   -0.37692    1.00000    0.09137   -0.09098    0.28655    0.48903
VAR418       0.06662    0.41608    0.49786    0.41817    0.08942   -0.57818   -0.31163    0.09137    1.00000   -0.69735   -0.07859   -0.01049
NVAR408     -0.11659   -0.18916   -0.23319   -0.24343    0.00604    0.46801    0.18874   -0.09098   -0.69735    1.00000    0.15202    0.01716
NVAR466     -0.21407   -0.18704    0.03653   -0.07922    0.39474   -0.03073   -0.19259    0.28655   -0.07859    0.15202    1.00000    0.40409
IB2NV408     0.18945    0.42669    0.34349   -0.15198    0.94900   -0.16325   -0.45147    0.48903   -0.01049    0.01716    0.40409    1.00000
NVAR348      0.06383    0.67387    0.68049    0.69668    0.46784   -0.35996   -0.21694    0.63168    0.15696    0.00620    0.17489    0.27829
IA2NV348     0.01796   -0.08195   -0.00480    0.09337   -0.31987   -0.25771   -0.19820   -0.39139    0.30439   -0.36293   -0.32700   -0.33645
B2           0.17333    0.42224    0.34191   -0.15536    0.94896   -0.17597   -0.45230    0.50728    0.00642   -0.00491    0.40852    0.99816
A2           0.02145   -0.07155   -0.01223    0.08303   -0.32235   -0.24596   -0.19973   -0.38766    0.33653   -0.39967   -0.37729   -0.33906
A           -0.17966   -0.23148   -0.22487    0.07795   -0.55051    0.25982    0.77967   -0.28737   -0.16714   -0.03862   -0.16715   -0.57905
B1          -0.03113   -0.23370   -0.18381    0.03915   -0.32235    0.15000   -0.19973    0.03358   -0.11761    0.45966    0.00434   -0.33906
CAMEROON     0.30204    0.07549    0.03488   -0.14394    0.16968   -0.01727   -0.10995    0.25520    0.04395   -0.18912    0.08406    0.21139
```

APPENDIX 3 (continued)

	NVAR348	IA2NV348	B2	A2	A1	B1	CAMEROON
CHANGENP	0.06383	0.01796	0.17333	0.02145	-0.17966	-0.03113	0.30204
LGNP	0.67387	-0.08195	0.42224	-0.07155	-0.23148	-0.23370	0.07549
LVAR469	0.68049	-0.00480	0.34191	-0.01223	-0.22487	-0.18381	0.03488
NVAR449	0.69668	0.09337	-0.15536	0.08303	0.07795	0.03915	-0.14394
IB2NV449	0.46784	-0.31987	0.94896	-0.32235	-0.55051	-0.32235	0.16968
NVAR328	-0.35996	-0.25771	-0.17597	-0.24596	0.25982	0.15000	-0.01727
IA1NV328	-0.21694	-0.19820	-0.45230	-0.19973	0.77967	-0.19973	-0.10995
VAR313	0.63168	-0.39139	0.50728	-0.38766	-0.28737	0.03358	0.25520
VAR418	0.15696	0.30439	0.00642	0.33653	-0.16714	-0.11761	0.04395
NVAR408	0.00620	-0.36293	-0.00491	-0.39967	-0.03862	0.45966	-0.18912
NVAR466	0.17489	-0.32700	0.40852	-0.37729	-0.16715	0.00434	0.08406
IB2NV408	0.27829	-0.33645	0.99816	-0.33906	-0.57905	-0.33906	0.21139
NVAR348	1.00000	-0.15871	0.27412	-0.17073	-0.12230	-0.06568	0.04108
IA2NV348	-0.15871	1.00000	-0.33707	0.99231	-0.25420	-0.14885	-0.08194
B2	0.27412	-0.33707	1.00000	-0.33968	-0.58012	-0.33968	0.24309
A2	-0.17073	0.99231	-0.33968	1.00000	-0.25617	-0.15000	-0.08257
A1	-0.12230	-0.25420	-0.58012	-0.25617	1.00000	-0.25617	-0.14102
B1	-0.06568	-0.14885	-0.33968	-0.15000	-0.25617	1.00000	-0.08257
CAMEROON	0.04108	-0.08194	0.24309	-0.08257	-0.14102	-0.08257	1.00000